JULY 16, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

A PROGRAM FOR MANAGEMENT IN 1956 . . No. 6

How To Live with SUB

Labor wants steady jobs, management wants steady production. Here's how to make both possible . . . page 121

✔ Second Half Auto Outlook . . . page 85

✔ Save with Shaped Wire . . . page 132

AETNA-STANDARD

ENGINEERING COMPANY·PITTSBURGH PA·U·S·A

DATE	PATENTS	NUMBERS
MADE [illegible] 1952	[illegible]	MAKERS [illegible]
STARTED [illegible] 10 1952		USERS [illegible]

Seal of Approval

for the KAUFMAN SINGLE SHEET CLASSIFIER

made by AETNA-STANDARD

MANY FEATURES AVAILABLE

ONLY

IN THIS PATENTED CLASSIFIER

This name plate represents progressive engineering and patented features . . . a mark of leadership as exemplified by quality, reliability and accuracy.

The patented Aetna-Standard Sheet Classifier sorts and piles sheets at high speeds automatically, selecting by gauge, surface and pinholes.

Controls, operated electronically, instantly spot imperfections and classify the sheets. Magnetic "eyes" also hold down the sheets and keep them in a straight line for fast, steady production.

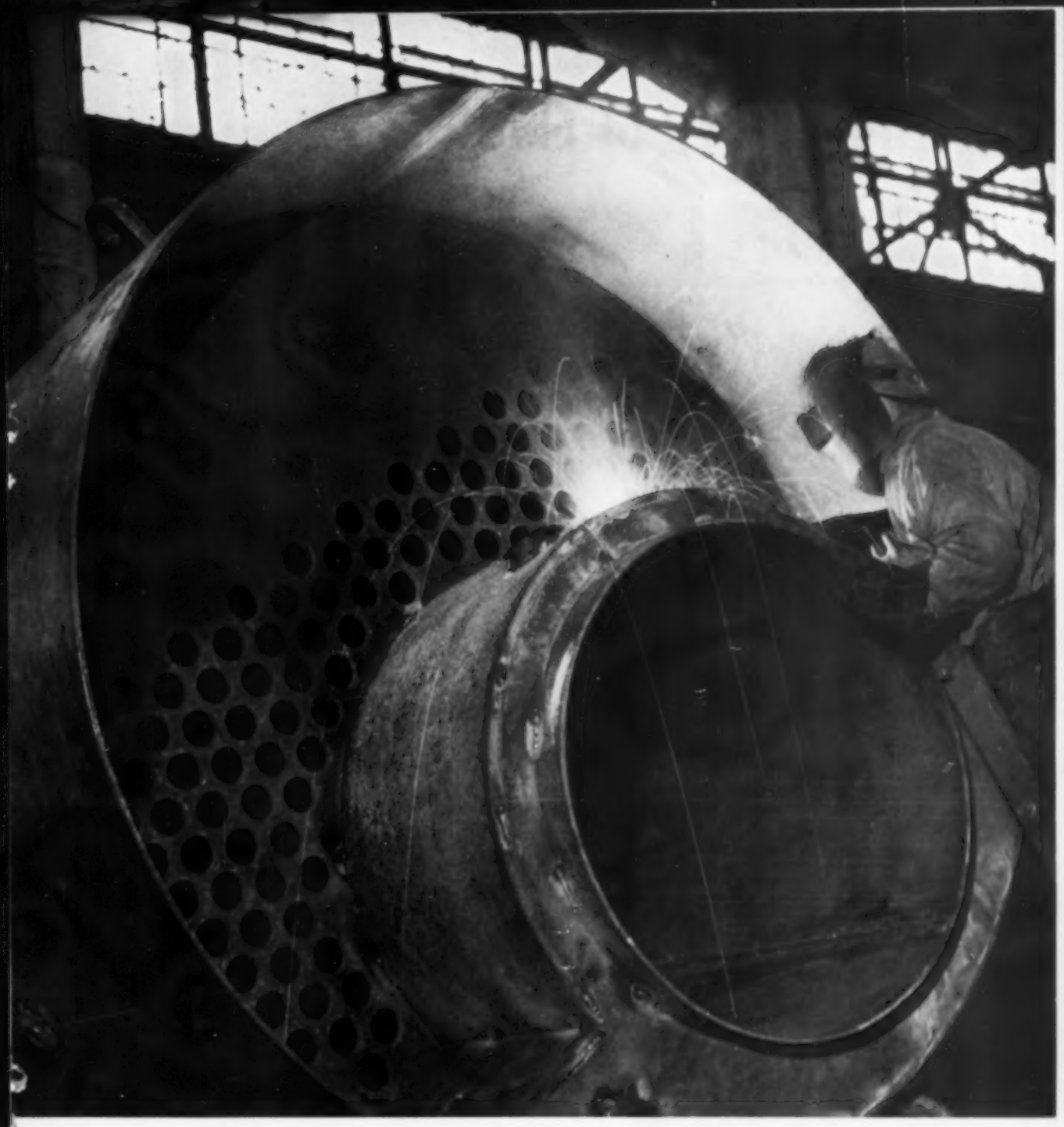
Most classifiers the world over carry this name plate, a symbol of Aetna's leadership in designing and building of equipment. The Classifier is used on many types of processing lines for the classification of electrolytic tin plate, black plate, cold reduced sheets and aluminum sheet products.

AETNA•STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



Welding Steel Plate for Scotch Boiler

This sturdy scotch wet-back boiler, fabricated from steel plate fusion-welded at all seams, will give years of dependable service. It is one of the many types and sizes of heating and power boilers fabricated from Bethlehem plates by Farrar and Trefts Division of Adsco Industries, Inc., Buffalo.

The uniform quality of Bethlehem plates makes them ideally suited to boiler construction. For the use of Bethlehem plates, together with good welding techniques, gives assurance of sound welds. Bethlehem plates come in a full range of sheared and universal mill sizes.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

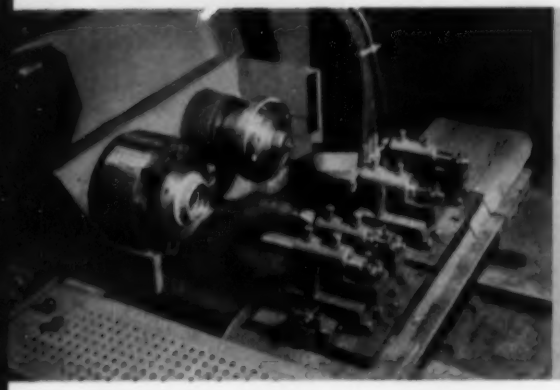
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

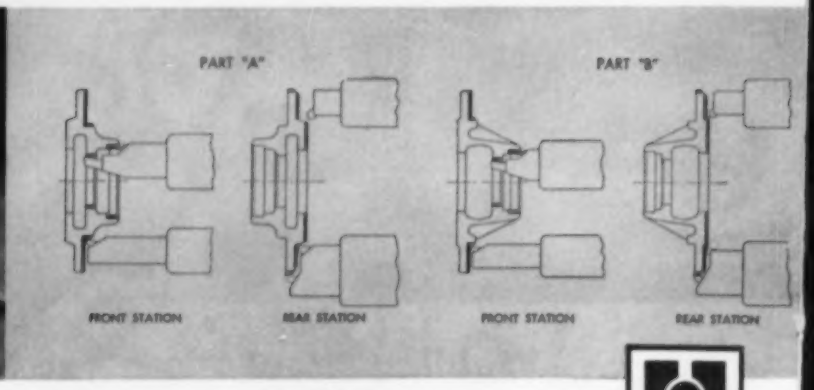
BETHLEHEM STEEL

BETHLEHEM STEEL

The ability of Heald **BORIZING*** to combine operations and reduce handling time can make other precision finishing methods obsolete, regardless of age of equipment

FOR EXAMPLE: *This One Bore-Matic Replaced Two Older Machines and Increased Production more than 50%*





This new Heald Model 321 Bore-Matic performs combined boring, turning and facing operations on both ends of two different differential bearing carriers, as shown in the diagrams above. The job was formerly done in sequential operations on two separate machines, at a net production of 105 parts per hour. Borizing on this single-machine setup increased production to 166 parts per hour, with closer tolerances, better finish and much easier operation.

It PAYS to come to Heald

HEALD®

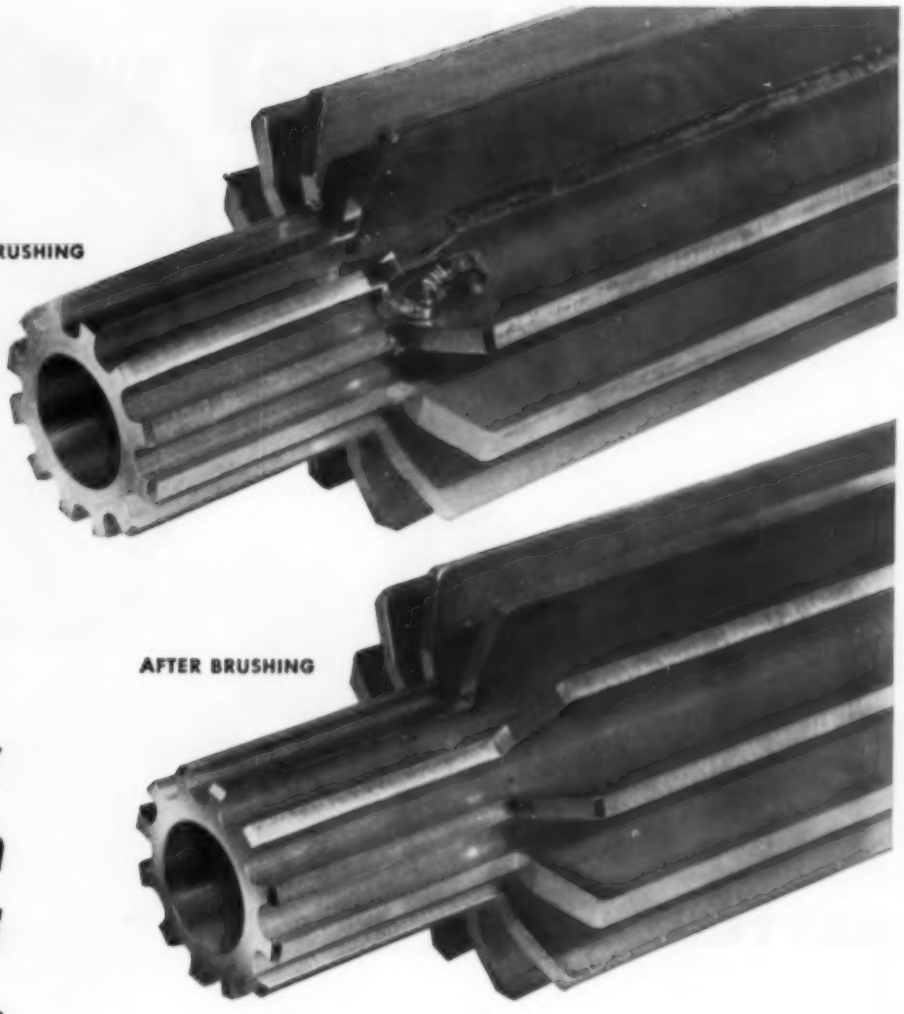
**Borizing is a copyrighted word meaning the application of any number or variety of precision finishing operations performed on a Heald Bore-Matic.*

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



Quick brush off for burrs

MACHINING this extruded aluminum armature shaft for an aircraft generator turns up heavy burrs. However, Osborn's power brushing method quickly removes burrs and—at the same time—blends all sharp edges.

This is typical of how industry is using Osborn power brushing to improve and speed up thousands of finishing operations.

An **O**sborn **B**rushing **A**nalysis made in your plant will show how *you* can profit from Osborn power brush finishing. Write *The Osborn Manufacturing Company, Dept. G-46, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

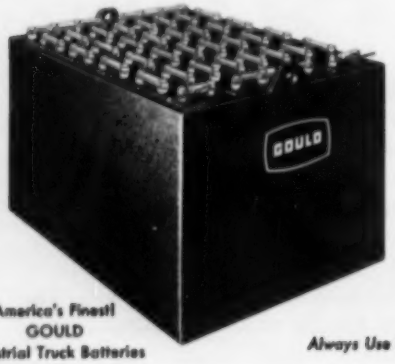
"Here's a Hot ONE!

Ever hear the one about the guy that didn't use

GOULD

Research-built

BATTERIES?"



America's Finest
GOULD
Industrial Truck Batteries

It's no joke when you pick the wrong battery. The lucky fellows are those that have standardized on GOULD. They not only have the satisfaction of knowing they've got advance-design, research-built batteries that will do more and last longer . . . they have the finest field engineering service in the industry to help keep these batteries in top condition throughout their greatly extended service life. Every Gould battery is proven in Gould's own pilot plant before it ever goes into production. That's why you can be sure of getting more power per dollar—with Gould!

Always Use Gould-National Automobile and Truck Batteries

GOULD
BATTERIES
GOULD-NATIONAL BATTERIES, INC.
Trenton 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

©1956 Gould-National Batteries, Inc.

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The Metalworking Weekly

July 16, 1956 Vol. 139 No. 3

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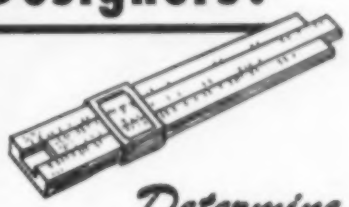
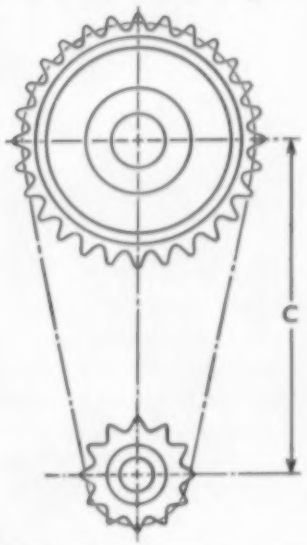
Designers!



Determine this Chain Length



GIVEN:

Teeth in small sprocket	17
Teeth in large sprocket	78
Center Distance	36"
Pitch of Chain	1"

To find — Chain length in inches.

(Answer below)

Acme Chains latest 76 page catalog brims with chain data. Filled with information on the correct and most efficient use of roller chain, cable chain and all types of sprockets. Among many other things it gives you the correct formula for computing proper chain lengths.

Answer: 122.12

FREE

76-page Catalog on application and use of Chains sent on written request. Write Dept.10C, Acme Chain Corp., Holyoke, Mass.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

Something to paste in Your Hat!
WALSH APEX
Extra Duty Firebrick
is the last word in high bulk density, low porosity, high heat transfer, maximum resistance to slag penetration and metal wash.

Designed specifically for use in lining closed and semi-closed hot metal torpedo type ladles, hot metal mixers and for checkering open hearths and hot blast stoves, Apex offers greater value per dollar invested. Isn't this the kind of economical service you want from the refractories you use?

WRITE FOR DETAILS

Specialists in Refractories of High Bulk Density and Low Porosity

WALSH
REFRACTORIES CORPORATION
101 FERRY STREET - ST. LOUIS 7, MO.
FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes

Striking Out

There can't be a controversy unless there are two sides, and when you have two sides, you have a conflict, and when you have a conflict erupting between labor and management, you have a strike, and you're welcome to it. Against the policy of strikes, it is urged that they cause heavy loss to both sides; that they seriously affect industrial life; that they hurt the general public; that the points gained by either side scarcely justify the cost of the strike. A strike, however, is essentially a war; so, naturally, the evils of war attend it. All strikes and wars are based on principles of justice; this is just as true as the fact that all marriages are made in Heaven.

Persons who think they can utter unprejudiced comments about wars or strikes are fooling themselves. The only really objective man is one who has just been washed by an undertaker. The steel strike, now; did you know that the best way to be objective about it is to recall that the first strike in America was called in New York in 1741?

Yes, sir, the bakers of New York City walked off the job that year. (It requires a great deal of restraint to renounce the opportunity to remark that they were after more dough, but we do renounce it.) The strikers were brought before the court on charges of "conspiracy," but they weren't convicted.

The shoemakers in Philadelphia struck for an increase of wages in 1792 and won. Drunk with power, they struck again in 1805, were convicted in court on a charge of "forming a combination to raise wages," and were fined $8 a head. (And this time, neighbors, we will NOT comment that they were the sole union to win a strike before 1800.)

SUB Gains Favor

Let's get on to something more serious. STEEL's Program for Management article this time has to do with getting along with SUB. When SUB was first broached at labor-management conferences, it was a mighty sickly subject. Neither side believed at the time that it would ever get up and walk by itself, but darned if it didn't. Today, with automation in the picture, both labor and management feel that SUB might become the planing tool that will level out those jagged lines you see on production charts.

STEEL's editors have given this article a lot of attention; the result is something you must place on your "must read" list, particularly if you have any interest whatsoever either in paying or receiving industrial wages. The article begins on page 121, and reprints may be obtained on request.

Ad Judges Still Active

Letters are still coming in evaluating advertising that appeared in the June 11 issue of STEEL. From an artist's point of view, we are told, that wasn't exactly the hottest issue ever produced here, but it certainly has stimulated the most amiable host of advertising art judges it was ever our pleasure to hear from. Next time, perhaps, we'll let the readers make their selection, and then let the artists determine if they can guess what the readers like. That's putting the shoe on the other foot.

Hot Bug Gets Cold Bug

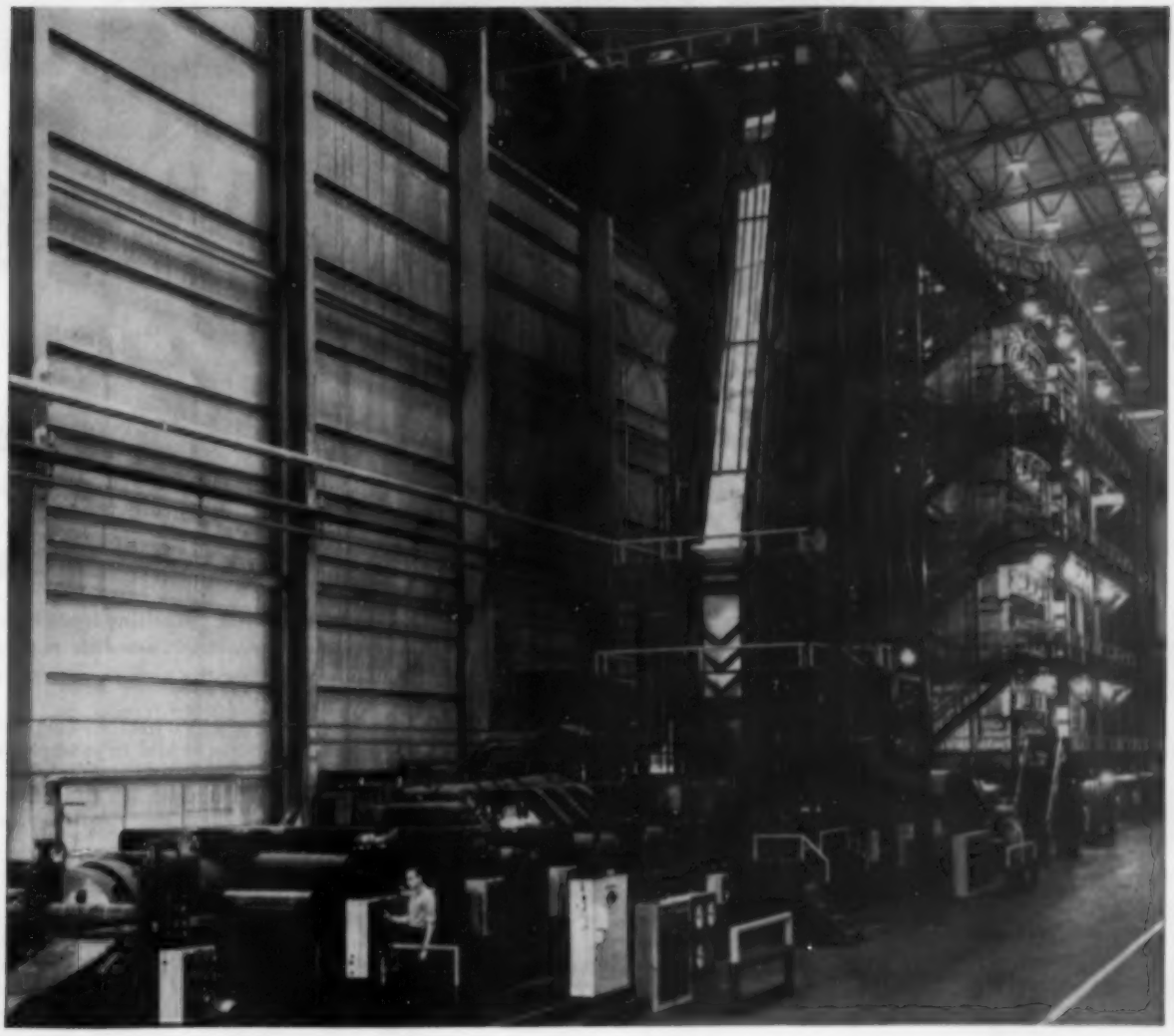
A shoe on a foot reminds us of the tender verse left on our desk some time ago by an anonymous entomologist who claimed he understood beetles—and not necessarily those that walk home in the sixth at Pimlico. He wrote:

In Egypt land there lived a bug,
A sniffling little scarab
Who'd caught a nasty nasal cold
When sneezed at by an Arab.
So later, when his mother said,
"You naughty little scarab,
You went and left your rubbers home!"
He grunted "I cat wear 'eb!"
"How come," she asked, "you cannot wear
Those rubbers made for scarabs?"
"By widdle claws is sharp," he cried,
"Ad dab it, Ba, I tear 'eb!"

Shrdlu

(Metalworking Outlook—Page 75)

B.F.Goodrich



Rubber stretches a mile of steel

A typical example of B. F. Goodrich improvement in rubber

THAT'S a mile-long strip of steel on its way to becoming tin cans. To toughen steel, they run it through that continuous annealing line at speeds up to 900 feet per minute. It does in 20 minutes what used to take two days. But for a while it looked like one of those good ideas that just wouldn't work.

The trouble was with the rubber-covered rolls that keep the long strip moving. After just a few hours, the rubber was worn smooth and shiny with rubbing plus high speed. Then the rolls couldn't grip, the steel smeared and couldn't be used for cans.

B. F. Goodrich engineers worked on the problem, and came up with a new rubber compound that helped make this process really practical. Rolls covered with the special rubber don't slip, don't glaze, don't mar the finish of the steel. And, in the mill shown here, B. F. Goodrich Strip-Grip rolls are lasting 10 times longer than the rolls used before.

Finding a way to improve steel mill rolls is an example of the B. F. Goodrich method of approaching a customer's problem. We have been able to solve equally difficult ones, just as successfully, in products you undoubtedly use. Your B. F. Goodrich distributor would like to tell you what these improvements are, and how they can be employed for your profit. *B. F. Goodrich Industrial Products Company, Dept. M-6V6, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

A-C Welders

LOW-COST SHOP WELDER (Model 20-S) 200 ampere A-C welder designed specifically for maintenance and repair of equipment or for light parts fabrication. Meets all NEMA specifications.

VERSATILE, PRODUCTION WELDER — (Model 200E) 200 ampere A-C light production welder. Full 75 open circuit volts — 60% duty cycle. Welding range from 30 to 350 amperes. Has all deluxe features.

FOR FARMS, GARAGES AND SMALL BUSINESSES — (Model U-18) 180 ampere, combination A-C welder and full 12 volt battery charger. Dual welding ranges for light or heavy gauges.

FOR TOP PRODUCTION AT LOW COST — (Model 300E) 300 ampere A-C production welder. Handles virtually all electrode diameters. All weather case.

End the "Power"

with A.O.Smith's line

Wide selection in both A-C and D-C welding machine lines helps you get the *right* machine for present work . . . sensible margin to handle future jobs. You pay only for the power you need.

YOU'LL find an A. O. Smith machine in virtually *every* amperage range . . . from 25 to 2500 amperes and in your choice of currents . . . A-C, D-C or Constant Potential. There are models available for manual, semi-automatic or completely automatic operation; for indoor or outdoor installations, and for light to extremely heavy-duty cycles.

In addition: (1) Every machine in the A. O. Smith line is insulated with silicone for greatest ability to withstand overloads and for increased resistance to corrosive or moist atmospheres. (2) All constant current machines have moving coil design for maximum safety, better welding characteristics, improved ventilation and longer life. (3) All have precision wound coils . . . stepless, easy-turning current control . . . high velocity ventilation and many other features designed to guarantee maximum performance and longer life.

Before you buy any welding machine, investigate this line in detail. You'll see why you buy better when you buy A. O. Smith job-matched power.

BUILT TO OUTLAST — TO OUTPERFORM — (Model 300) 300 ampere A-C heavy-duty production welder. More iron and copper plus silicone insulation make this model a workhorse.

FOR EVERY JOB IN YOUR PLANT — (Model 400E) 400 ampere A-C production welder with the widest ampere range in industry — from 75 to 580 amperes.

FOR THE FINEST IN PRODUCTION WELDING — (Model 400) 400 ampere A-C production welder. Handles sustained heavy loads without fear of machine damage. Production proved on industry's toughest jobs.

UNEQUALLED FOR QUALITY FEATURES — (Model 500) 500 ampere A-C production welder. Has all the deluxe features necessary for smooth, efficient operation and offers many extra years of machine life.

MANUAL OR AUTOMATIC WELDING (Model 650E) 650 ampere A-C welder. Singly or in series — specifically designed for the shop that cannot afford inflexible automatic equipment.

D-C Welders

D-C WELDING AT LOWEST COST (Model 2000) 200 ampere D-C production welder. 80 open circuit volts — 60% duty cycle. Welding range 25 to 345 amperes. NEMA rated.

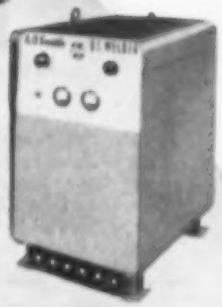
INDUSTRY'S MOST VERSATILE D-C WELDER — (Model 3000) 300 ampere D-C rectifier. Has four different arc characteristics at the flip of a switch. Positive thermal overload protection.

FOR YOUR TOUGHER D-C JOBS (Model 4000) 400 ampere D-C rectifier with exclusive downdraft ventilation. Smooth arc — forcing arc and arc booster selection are but a few of its features.

MANUAL OR AUTOMATIC D-C WELDING— (Model 6000) 600 ampere D-C rectifier. A versatile, all-purpose D-C power source. Particularly suitable for use with C-OMATIC or C-OMANUAL.

Guessing Game"

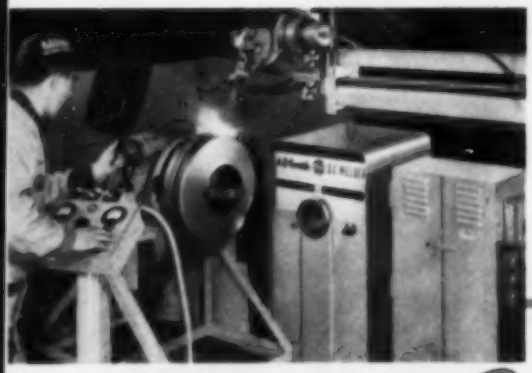
of job-matched welders



FOR INERT GAS AND SUBMERGED ARC — (Model 600CP). Full 600 ampere constant potential welder. Zero to 45.4 voltage range. Built-in 110 volt power supply — superior voltage regulation.

FOR WELDING . . . FOR POWER (Model 10,000) 1000 ampere D-C rectifier power unit designed to replace motor generator equipment. Use as a high-amperage D-C welder or as a compact power source.

COMPACT CONSTANT POTENTIAL POWER — (Model 1500CP) 1500 ampere C.P. welder for multiple operator use (10 to 16 welders). Designed to augment or replace existing motor generators.



C-OMATIC — **for automatic welding saving thousands of dollars annually over Helium or Argon. Easy to set up, easy to use. Includes control console, remote control stand, automatic head and A. O. Smith 600-amp D-C power.**

1250 AMPERE D-C POWER — (Complete information available on request).

2500 AMPERE D-C POWER — (Complete information available on request).

Plus **C-OMATIC and C-OMANUAL...** **not only the first and finest in carbon dioxide processes, but the fastest, most economical of all gas-shielded arc processes.**

C-OMANUAL — **new carbon dioxide, hand gun process puts manual welding on a virtual mass production basis. Includes lightweight hand gun which automatically compensates for arc length, portable control console and special A. O. Smith D-C rectifier.**

Through research ...*a better way*

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

INTERNATIONAL DIVISION, MILWAUKEE 1, U. S. A.

FIRE!

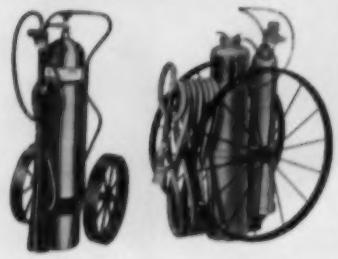
HOW TO DETECT AND EXTINGUISH IT IN SECONDS!

HAND PORTABLES

Carbon Dioxide | Foam Soda-Acid Clear Water Anti-Freeze | Pressurized Water Anti-Freeze | Dry Chemical

Kidde CO_2 Portables, either trigger-release type or squeeze-type valve models, are available in sizes from 2½ to 20-pound capacities. New Kidde Wet Chemical extinguishers are available in 2½ gallon bronze or stainless steel models, including pressurized Water or Water-Anti-Freeze Unit (illustrated). Kidde Dry Chemical Extinguishers are available in cartridge-operated models of 20 and 30 pounds capacity or pressurized models of 5 and 10 pounds capacity.

MOBILE EQUIPMENT

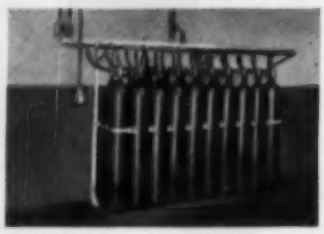


50, 75 and 100 lb. CO_2 Units | 150 lb. Dry Chemical Unit

For major fire hazards, get a mobile unit. Wheeled CO_2 units are available in 50, 75 and 100 pound capacities, in one cylinder.

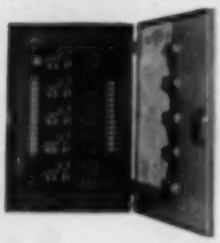
150 pound dry-chemical unit has straight stream for long range . . . fan pattern for wide coverage. Both units give expert results even with inexperienced operator.

CO_2 SYSTEMS



New Kidde pressure-operated CO_2 extinguishing systems are individually designed to fully protect even the most dangerous hazards, use no falling weights or clumsy mechanical triggering methods. Pneumatic Control Heads insure instant and complete CO_2 discharge. Directional Valves afford protection to more than one hazard using the same bank of CO_2 cylinders.

ATMO DETECTING SYSTEMS



Kidde ATMO is a wide-area automatic fire detecting and warning system which works on the principle of rate-of-temperature-rise. It is ideally suited for cases where life protection is of vital importance, or where quick, early detection of fire in valuable materials is essential.

The very first hot breath of fire triggers the ATMO system, and sounds the alarm. In addition, the system can also close doors, shut off fans or blowers – all *automatically*.

What's more, the Kidde ATMO system operates independently of regular power sources, will still give protection even if outside power fails.

Kidde

Walter Kidde & Company, Inc.
760 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd.
Montreal—Toronto

LETTERS
TO THE EDITORS

Good Trend Indicator

For the last two years or more, we have avidly read your management articles. They have been most foresighted, provocative and stimulating. I am sure they have indicated the trends to both young and older management men.

We have found them of such interest that we would appreciate it if you would send us one complete set of each article appearing in 1954, 1955 and so far in 1956.

These will become part of my own management reference file and can be of great usefulness to me.

J. E. Borendame
Director of Marketing Services
Acme Steel Co.
Chicago

Request from 'Down Under'

Being a teacher of heat treatment at the Sydney (Australia) Technical College, I have a considerable interest in your publication.

Could you forward three copies each of the articles, "Heat Treating Steel Castings" (Jan. 23, page 84) and "What You Can Do About Metal Fatigue" (Jan. 16, page 68)?

They are really good articles, and I would appreciate receiving them.

James Bertram
64 Melvin St.
Beverly Hills N.S.W.
Australia

I am a technical consultant to some corporations and often read STEEL. In the Jan. 16 issue (page 68), I noticed the article on stress and its prevention in metals, which appealed to me. May I have a reprint?

D. V. Stellin
Box 363
Old Post Office
Chicago

Data on Copper Sought

In your May 7 issue, we noted the interesting article, "How To Choose the Right Copper" (page 94). We would be grateful if you would be good enough to send send us a copy.

E. N. Lewis
Director
Ratcliffe (Canada) Ltd.
Richmond Hill, Ont.

Antiacid Buffer Gets Attention

We are presently investigating molybdenum disulphide lubricants and found your comments in the Apr. 9 Technical Outlook column (page 111) concerning

(Please turn to page 12)

faster

Royal Blue has won acceptance *faster* than any other wire rope in Roebling history

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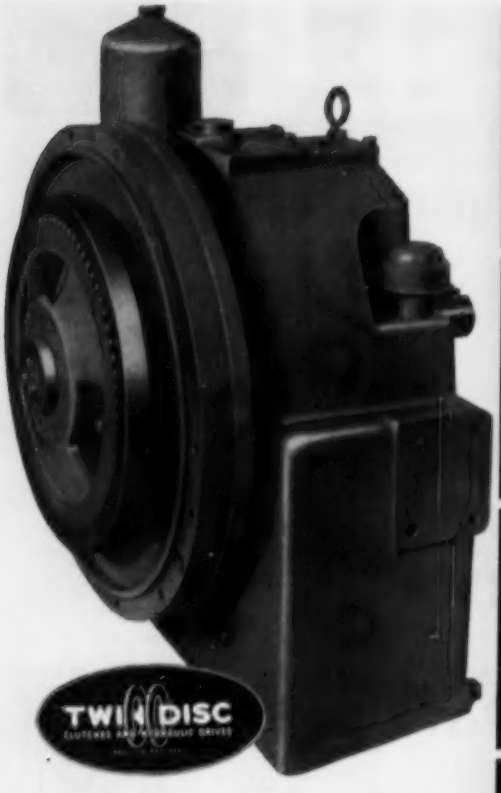

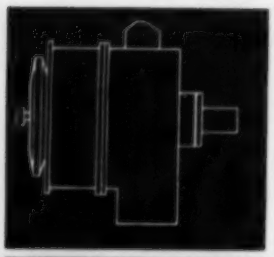

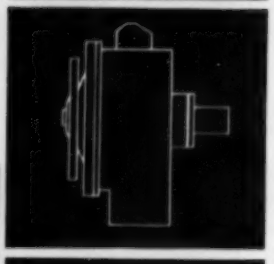

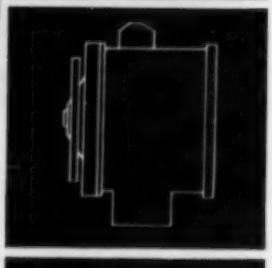

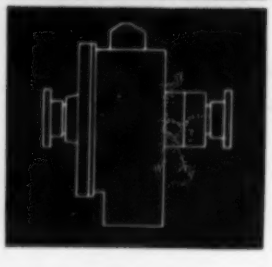

announces new

SINGLE-STAGE

Torque Converters

Here's another good answer to the power transmission problems involved in today's heavy-duty machinery—the all new Twin Disc *Single-Stage* Torque Converter.

The new single-stage torque converter is currently available in the 1500 Series, which is applicable to engines producing from 30 hp at 1150 rpm to 207 hp at 2500 rpm. Four models provide various input and output combinations.

Already time-proved by extensive field tests, this single-stage torque converter is ideal for use in shovels, hoists, draglines, front-end loaders . . . in all types of construction, mining, logging and oil field equipment requiring smooth, efficient, dependable torque multiplication.

This new Twin Disc Torque Converter will cut operating costs . . . boost profits . . . handle the toughest jobs with ease. The converter's smooth flow of power eliminates sudden load shocks between engine and driven equipment . . . cushions out harmful vibrations.

Specify a Twin Disc Torque Converter, single-stage or three-stage, in your next piece of heavy-duty machinery or when you repower your present equipment.

TWIN DISC

TWIN DISC

Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION Rockford, Illinois

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LETTERS

(Concluded from page 10)

a buffer for free acid interesting. We would like further technical information.

Vito V. Mitkus
Project Engineer
Diamond Chain Co. Inc.
Indianapolis

Please advise name of manufacturer.

D. F. Elliott
Purchasing Agent
Square D Co.
Cedar Rapids, Iowa

We would appreciate your sending us the name of the manufacturer.

Mrs. James E. Rempe
Engineering Librarian
Standard Register Co.
Dayton, O.

• *Write: Lockrey Co., Development Department, Lubricants Division, Southampton, N. Y.*

'Ideas' Used to Advantage

Please send me a copy of the article, "Ideas for Industry" (Apr. 23, page 105). It is a stimulating approach, and a technique we can use to advantage.

C. G. Brooks
Sales Promotion Manager
Electric Motor Division
A. O. Smith Corp.
Tipp City, O.

Please send one copy each of the Apr. 23 "Ideas for Industry" article and "New Vistas for Stainless" (Apr. 30, page 92). We are certain both articles will prove to be of considerable value to us in the future as well as of considerable interest at present.

Paul C. Harmon
Commercial Research Department
Market Development Division
Armco Steel Corp.
Middletown, O.

Exciting Exposition

We consider your article, "Honeycomb Panels: On the Threshold of a Boom" (June 11, page 112), to be a thorough—though brief—exposition of the subject. It should excite interest in many quarters.

Wilder D. Baker
Vice Admiral USN (Ret.)
Director of Public Relations
Solar Aircraft Co.
San Diego, Calif.

We would appreciate extra copies. It is an excellent article and we are vitally interested.

D. Baxter
Honeycomb Structures Co. Inc.
Los Angeles

Where To Get Handbook

We desire to obtain a copy of *The Retirement Handbook* written by Joseph C. Buckley, and referred to in "Workers Prepare To Retire" (June 11, page 69). Will you please furnish us with the name and address of the publisher?

W. N. Ireland
Purchasing Agent
Nevada Mines Division
Kennecott Copper Corp.
McGill, Nev.

• *Write: Harper & Bros., 51 E. 33rd St., New York 16, N. Y.*

Lukens "T-1" Steel Takes on Tough Job for C & O Railway!

Horne Brothers of Newport News, first-line fabricators to the shipping industry, are building several new, improved coal trimming machines for the C & O Railway. Lukens "T-1" steel was specified to cut weight, combine strength and abrasion resistance. A number of other Horne Brothers' projects of Lukens "T-1" steel are already in the works.

Fabricator of unique new coal loader says:

"NEVER WORKED WITH AS TOUGH AND STRONG A STEEL THAT'S SO EASY TO WELD!"

■ *Enthusiastic* is the word for Horne Brothers' reports on Lukens "T-1" steel. They call it the best steel yet to combine strength and toughness, impact and abrasion resistance, and the all-important feature of excellent weldability.

Lukens "T-1" steel is economical, too. On this coal loading machine, for example, Horne Brothers was able to effect a 25% reduction in overall plate thickness – a direct result of this new steel's great strength. The finished machine will weigh far less than previous trimmers, operate with greater efficiency, less maintenance and increased life expectancy.

No wonder Horne Brothers is so well satisfied. No wonder they are planning to build more equipment of Lukens "T-1" steel – *right away!*

If your problem is equipment weight... abrasion, impact or atmospheric corrosion... the need for toughness at temperature extremes ... it will pay you to investigate this amazing new alloy steel now.

For the latest in fabrication techniques and specifications, write to Manager, Marketing Service, 847 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS "T-1" STEEL

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

WHICH PRODUCTION PATTERN IS YOURS?

JOB LOTS—VARIETY OF SMALL PARTS

JOB LOTS—VARIETY OF LARGE PARTS

HIGH PRODUCTION—SAME SMALL PARTS

HIGH PRODUCTION—SAME LARGER PARTS

NOW . . . 4 NEW G-E INDUCTION HEATERS MATCH

You get maximum induction heater performance at minimum investment cost when you choose one of General Electric's new electronic induction heater models. Each model is tailored to one of the basic production patterns illustrated above. This lets you buy only the induction heating features you need for your particular production pattern.

In any one of the four ratings—7½-, 15-, 25-, 40-kw—you can choose a model to match your production pattern:

FOR HEATING SMALL AREAS the built-in output transformer is recommended. This feature enables you to couple power at maximum efficiency into a wide variety of low-impedance inductor coils.

FOR HEATING LARGER AREAS the tapped tank coil is recommended. The tap-adjustment feature lets you couple the heater power into a wide variety of high-impedance inductor coils.

FOR JOB-LOT PRODUCTION OF A WIDE VARIETY OF PARTS, variable power adjustment is recommended. Grid control of thyratron tubes permits manual adjustment of power under load from 0 to 100 per cent.

FOR HIGH-VOLUME PRODUCTION, IN WHICH YOU DO NOT HAVE RAPID CYCLING, the variable power adjustment feature is not needed. In these applications, the heater is adjusted initially to heat a specific part. No further adjustment is necessary until you change to a different part.

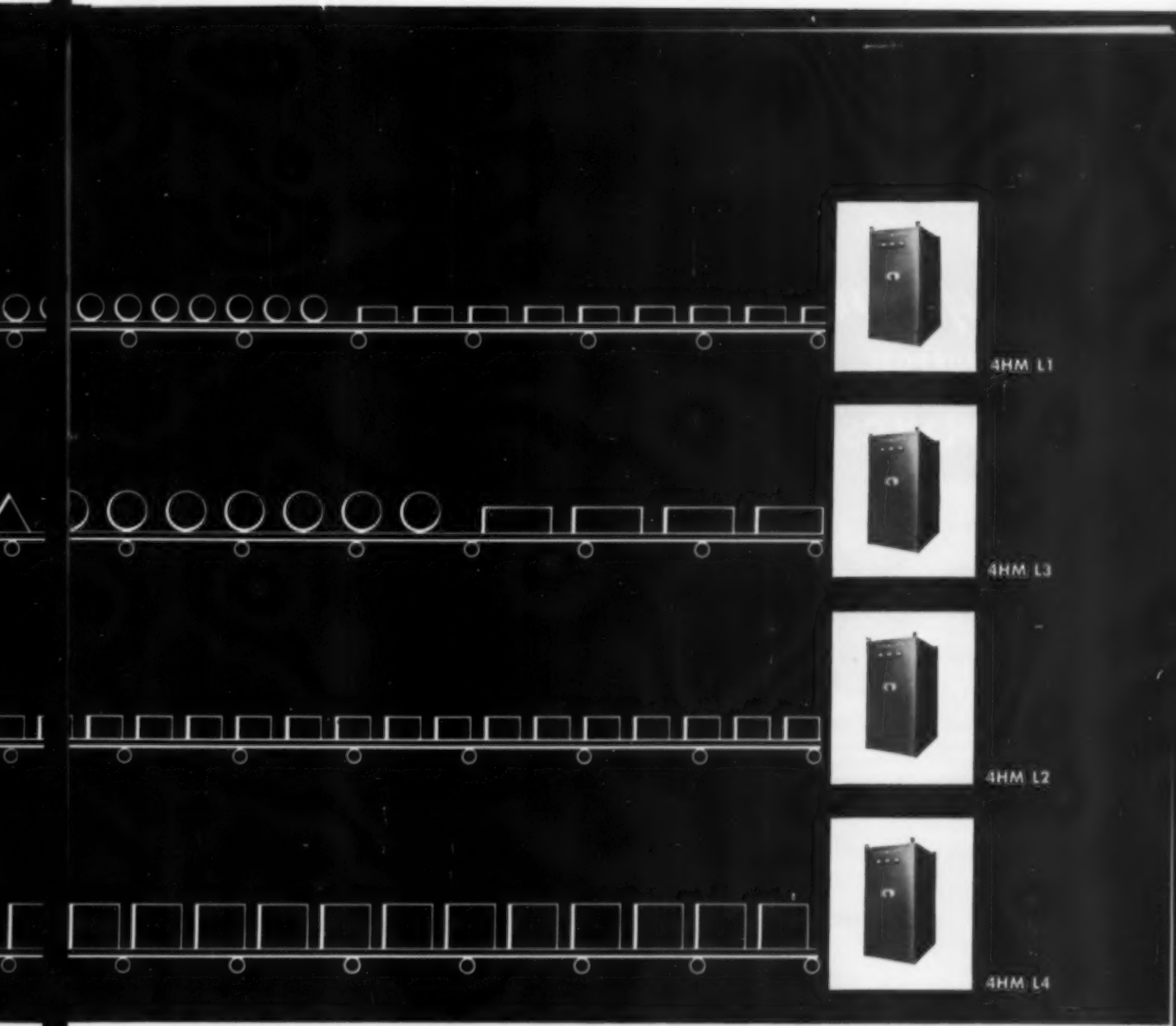
Features in any of the four ratings can be combined in the following fashion:

Model	Thyratron	Output Transformer	Tapped Tank Coil
4HM L1	x	x	
4HM L2		x	
4HM L3	x		x
4HM L4			x

Your nearby G-E Heating Specialist will help you choose the model best suited to your production pattern. You'll be paying only for those induction heater features you will use in your operation.

For specific bulletin information about these new induction heaters send in the coupon at the right.

GENERAL ELECTRIC



ANY PRODUCTION PATTERN . . . ECONOMICALLY

G.E. Gives You All These Features — and More!

DESIGN FEATURES	G.E.
High KVA Oscillator	
Built-in Water-to-air Heat Exchanger	
Readily Accessible for Maintenance	
Four Models in Each Rating	
Totally enclosed Aluminum Oscillator Box	
Dust-tight Cabinet Construction	
Industrial-type Oscillator Tubes	
Filament Voltage Regulation of ±3%	
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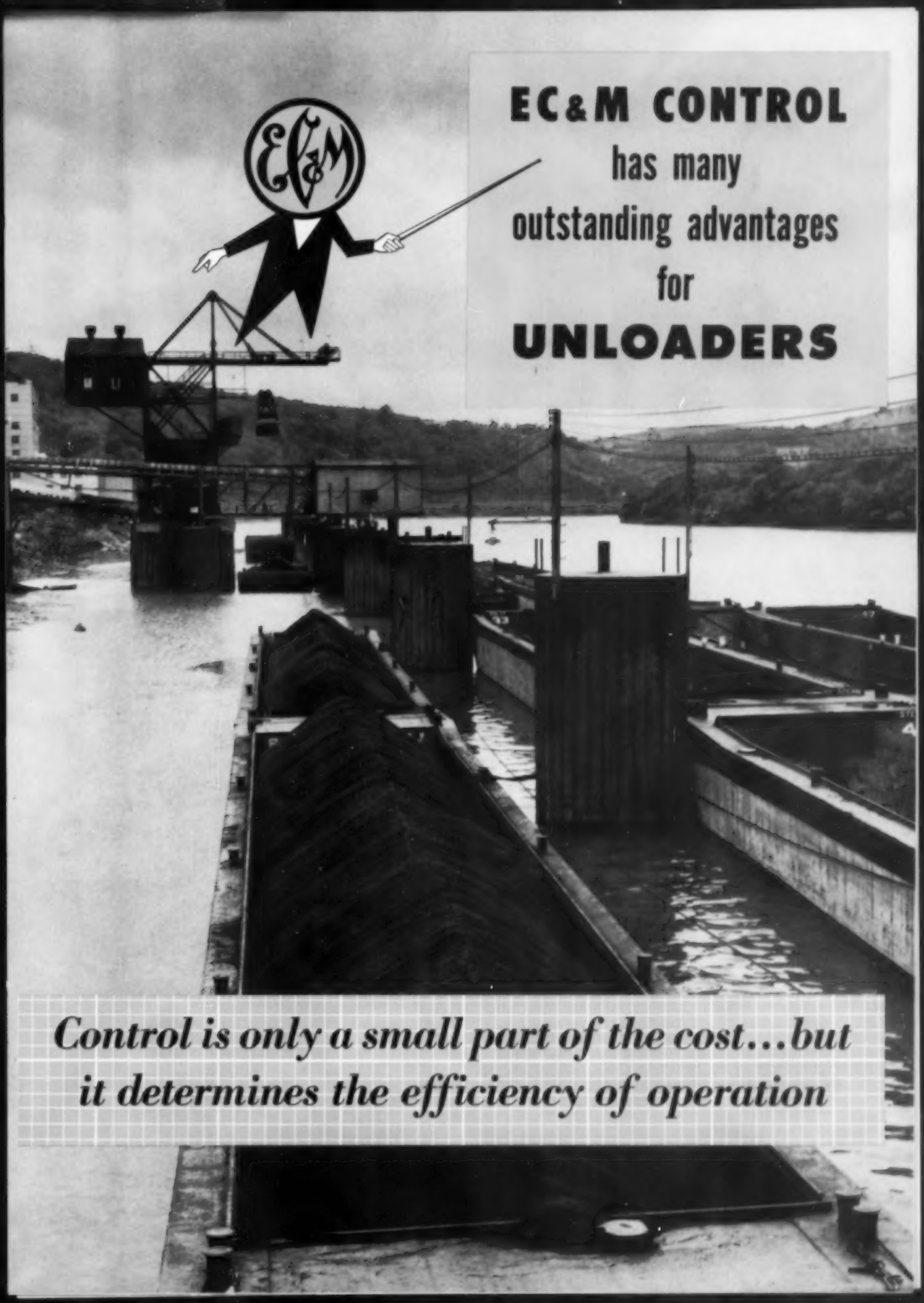

EC&M CONTROL
has many
outstanding advantages
for
UNLOADERS
Control is only a small part of the cost...but
it determines the efficiency of operation

EC&M CONTROLLERS . . .

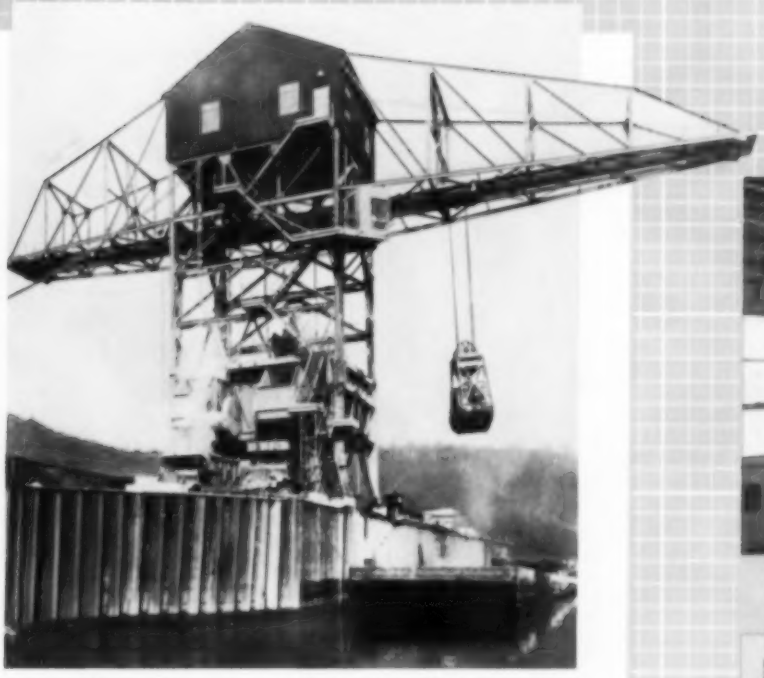
Coal is handled from barge to power plant at an eastern electric generating plant at the rate of 400 tons per hour by this Clyde Unloader equipped with EC&M Control. **Photos — courtesy of Clyde Iron Works, Inc.**

Barges of coal (900 tons per barge) as shown on the preceding page, are unloaded by this 7-Ton Wellman Unloading Tower under EC&M Control at a western Pennsylvania generating plant. **Photos — courtesy of West Penn Power Co.**

On the Ohio River, this McKiernan-Terry Unloading Tower equipped with EC&M Control lifts coal from river barges at the rate of 1200-Tons per hour to supply this generating plant.

Two 15-Ton Drave Unloaders at the B & O Import Ore Pier at Baltimore, Maryland are completely equipped with EC&M Control. This pier established an eastern seaport record for unloading ocean vessels.

operating from standard voltages . . . are low in cost, safe, simple and easy to operate



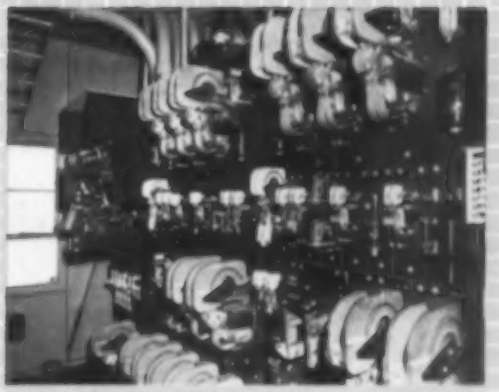
500-ton-per-hour Barge Unloader, designed, fabricated and erected by Heyl & Patterson for the Duquesne Slag Company, Pittsburgh, Pa., and equipped with EC&M Control has been giving excellent results for many years.

Ton by ton . . . EC&M Control helps move bulk materials with an increased output and lower cost that appeal to management. Operators appreciate the smoothness of performance and quick manipulation.

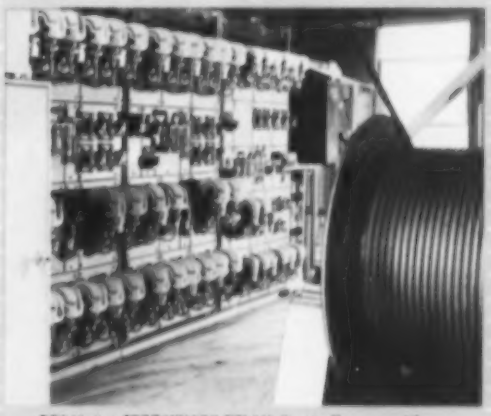
Time-saving advantages of this Control are numerous. Some of these are: facility for paying out cable to dig into the pile, taking the swing out of a loaded bucket at the point of discharge, and keeping the bucket open when lowering for another load.

On river unloading stations, at lake and ocean ports, EC&M Control has earned a reputation for fast lifts . . . safe lifts. To EC&M, each material handling machine is thoroughly investigated . . . the mechanical as well as electrical details, the duty cycle and all important data are considered. From *these facts*, EC&M *accurately engineers* the control for the individual job . . . this results in the greatest service at lowest maintenance. EC&M Control is well-known for reduced manpower and lower renewal part expense. Look at the proof of acceptance of EC&M Control for the wide range of applications shown here.

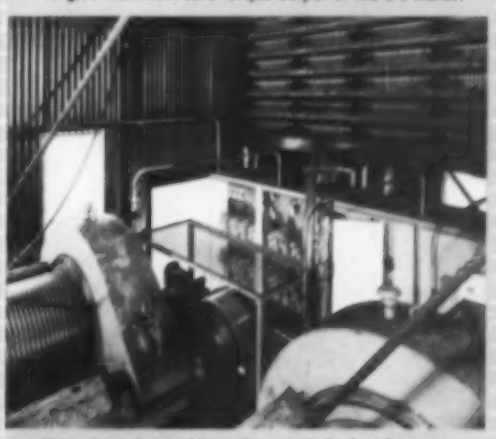
It pays to "SPECIFY EC&M CONTROL"



EC&M D-c TIME-CURRENT Controllers on Drave Unloaders. All power is brought into the operator's cab on this installation for maximum safety.

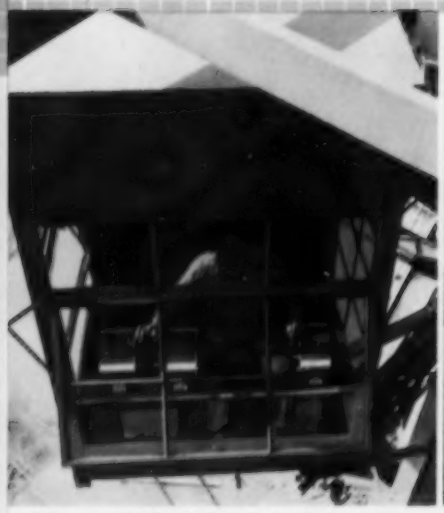


EC&M A-c FREQUENCY-RELAY Controllers provide accurate switching of Closing and Holding Line circuits to give maximum safe torque output of the a-c motor.

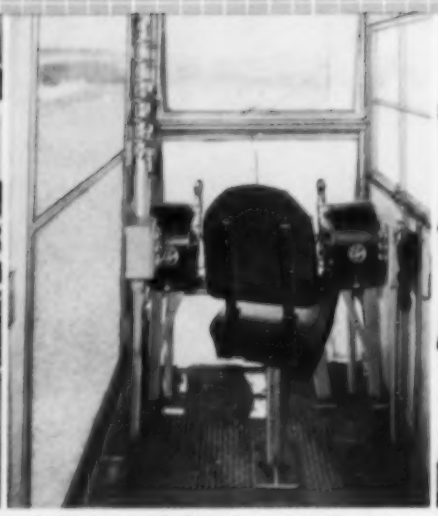


This view shows EC&M Type WB Brake, Frequency Relay Controllers in Cabinets with TAB-WELD Plate Resistors mounted overhead.

Quick Response coordinated with *Safe Operation*



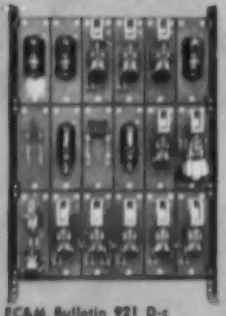
Narrow width EC&M Cam Master Switches are closely grouped for operator's convenience in this cab.



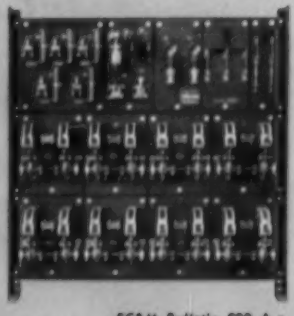
In this narrow cab, EC&M Cam Master Switches require minimum space. This short throw of operating handles contributes to the ease of operation.

Here, the operator controls the Trolley movement through a Foot Master Switch. Hand-operated EC&M Cam Master Switches are used to control the bucket operation.

Control Engineered for the Job gives smoother performance

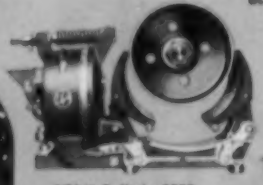


EC&M Bulletin 921 D-c Crane-hoist Controller uses the Wright Circuit for safety, simplicity.

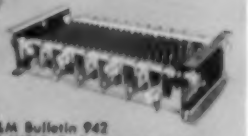


EC&M Bulletin 930 A-c Centra-torque Hoist Controller with Frequency Relays for acceleration, plugging and speed limiting functions.

Bulletin 1190 EC&M Cam Master Switches are narrow in width and have a short throw from full-on to full-off positions.



EC&M Bulletin 1000 WB Brakes give fast release . . . quick set. Are supplied for rectifier-operation on A-c motors.



EC&M Bulletin 942 TAB-WELD Resistors save manpower. No periodic clamping-nut tightening . . . no burning at grid eyes or at tap-plates.

Here's where EC&M Control excels

FAST GETAWAY EC&M uses load-responsive acceleration relays (Time Current on d-c, Frequency Relay on a-c) to provide maximum, safe torque values for efficient unloader operation. These exclusive EC&M Relays provide the fastest, safest acceleration which results in rapid bucket handling . . . fast trolley movement . . . overall reduced time between trips.

WIDE SPEED SELECTION The operator always has at his command a choice of speed-points. And the better speed-range on each point provides greater flexibility for normal operation and during clean-up.

SMOOTHER STOPPING When checking motor lowering speeds, the Resistor values of EC&M Control are *accurately designed* to give quick, safe, smooth stopping of light loads, full loads or the empty bucket. EC&M Acceleration and Plugging Relays automatically govern the rate of acceleration, stopping and reversal of the trolley motion for top performance.

SPEED-LIMITING *Safety* on all Speeds. EC&M High-speed Contactors respond instantly to the Operator's manipulation of the Master Switch; motor connections are switched quickly to conform with the well-known characteristics of EC&M Circuits, which maintain safe lowering and operating conditions at all times.

When buying UNLOADERS, specify EC&M Control

SQUARE D COMPANY

EC & M DIVISION • CLEVELAND 28, OHIO

How New Chromium plating process solves problems for two companies

♦ **"Crack-Free" Chromium gives washing machine shafts solid protection from rust**

♦ **Manufacturer eliminates undercoats for die cast hardware with new Unichrome process**

Unichrome Crack-Free Chromium Plating is proving superior to ordinary chromium in certain types of applications . . . especially where durability and protection are at stake.

PROVES IDEAL IN WASHING MACHINE

Steel drive shafts in well known washing machines are now plated directly with Crack-Free Chromium about .0005" thick. Unlike *ordinary* chromium, this deposit has no microscopic cracks to admit water, humidity, soap and detergent spillage. Shafts stay rust-free, and get extra wear-resistance besides.

ONE-STEP PLATING OPERATION

Chromium was the finish wanted for new line of zinc die cast cabinet hardware. Also wanted was a process that would permit the company to get into immediate production with an existing tank. Unichrome Crack-Free Chromium satisfied both needs. The company now plates directly on the castings, eliminating copper and nickel plating stages, extra handling, and need for major new equipment. The matte gray finish is buffed up readily to high lustre.

This is just one of many Unichrome developments in processes, equipment and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

UNICHROME

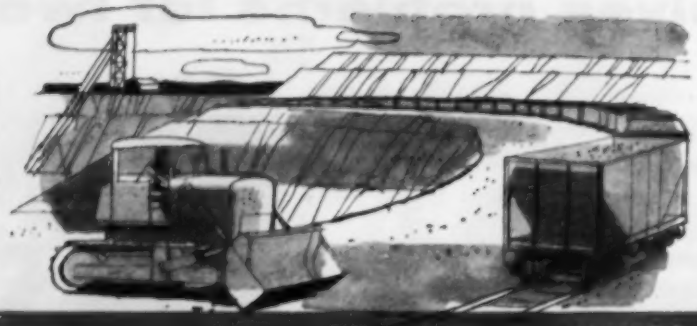
METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit-United Chromium of Canada, Limited, Toronto

From Mine to Mill...

Allis-Chalmers Equipment serves in every part of the Steel Industry... Dependably, Economically

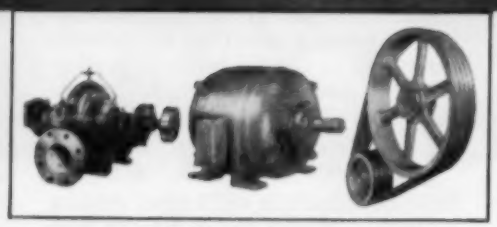
For more than three quarters of a century, Allis-Chalmers has served the steel industry — supplying the equipment needed to produce top quality steel... the manufacturing "know-how" to meet heavy-duty operating conditions... the pioneering spirit to keep up with the changing requirements of the industry. Allis-Chalmers machines are employed, not just in one phase, but all through the steel-making process. For complete information on how Allis-Chalmers can help solve your machinery problems, consult your Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.

Regulex and *Texrope* are Allis-Chalmers trademarks.

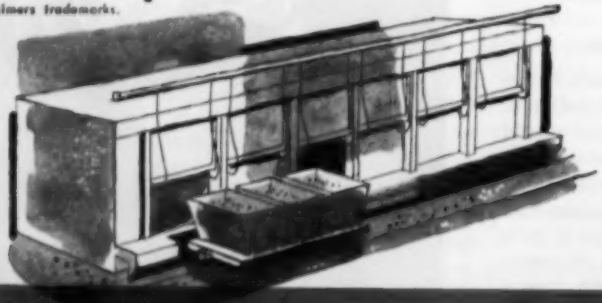


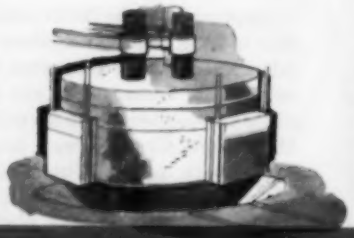
MINES...

Crushers, grinding mills, vibrating screens engineered and manufactured by Allis-Chalmers crush the ore-bearing rock, grind it to specified size, size and wash metallic ores, stone and coal.

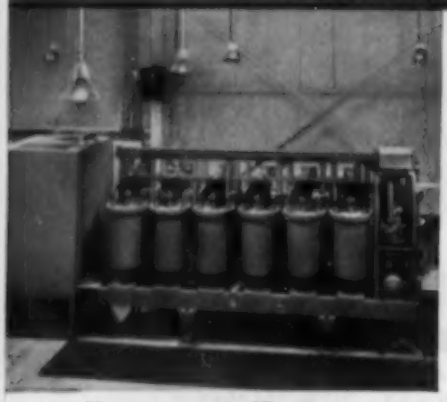


Allis-Chalmers pumps, motors, *Texrope* drives are in wide use throughout the metal industry because of their long life characteristics, low maintenance requirements and great versatility.

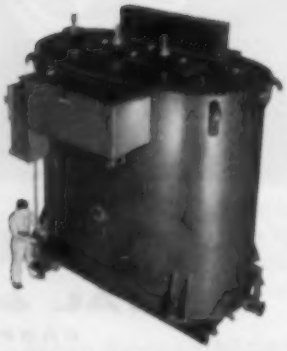




OPEN HEARTH... **ELECTRIC FURNACE...**

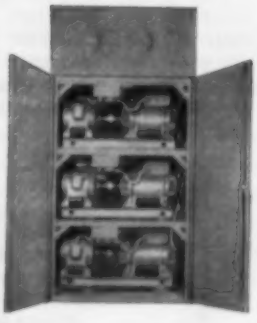


Mercury-arc rectifiers furnish constant voltage dc power for material handling in open hearth and other mill operations and for mine haulage. Variable voltage units are supplied for supporting main roll drives.



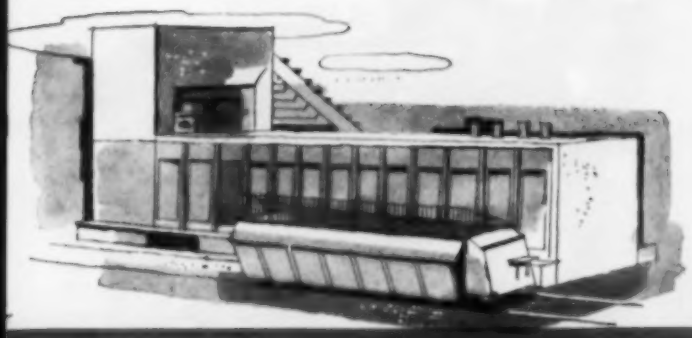
Allis-Chalmers arc furnace transformers are of well-balanced design and extra heavy duty construction — proven in 25-30 years of repeated daily short-circuits in electric furnace operation.

***Regulex* control** balances arc current with arc voltage, almost instantly — maintains desired arc condition automatically.

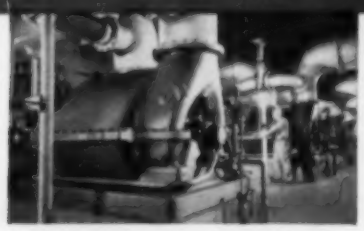


ALLIS-

. . . It's Allis-Chalmers

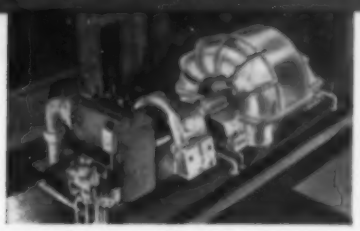


COKE OVEN...



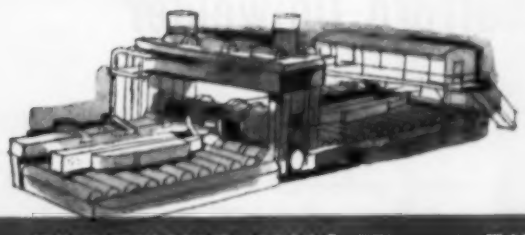
Booster, exhauster or combination service requirements are met by Allis-Chalmers blowers. Photo shows four 23,000-cfm, 5100-rpm, 3.5-psig centrifugal exhausting blowers in a western steel mill.

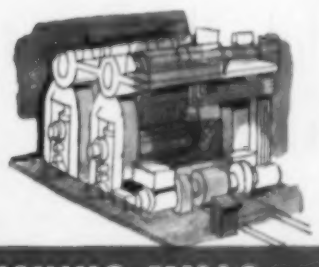
BLAST FURNACE...



Blast furnace blowers furnished by Allis-Chalmers meet blast furnace requirements. The 75,000-cfm, 30-psig centrifugal blower shown here has been in service since 1942. It is driven by an 8500-hp steam turbine.

Allis-Chalmers axial blowers are designed for high efficiency blast furnace duty. They are smaller, easier to install — save $50,000 or more in steam per year. A-C also builds constant efficiency rotary compressors.





BLOOMING MILL...

Motor room photograph shows Allis-Chalmers switchgear, control, constant and variable voltage motor-generator sets, Regulex m-g sets, liquid rheostat, and twin-drive motors in use in a midwestern steel plant.

FINISHING MILLS...

Hot strip, cold reduction, temper, rod and wire mills, and annealing and pickling lines employ Allis-Chalmers control, power equipment and drive motors for dependable operation.

Other Equipment

Besides the power utilization and conversion equipment illustrated, Allis-Chalmers also supplies power generation and distribution requirements from mine to mill.

For power generation, A-C builds steam turbine-generator units, surface condensers, water conditioning equipment, pumps, motors, and control. Also hydraulic turbines, generators, governors, and valves. For power distribution, A-C furnishes transformers, voltage regulators, circuit breakers, switchgear, and substations.

Throughout this wide range of products, you can depend on Allis-Chalmers for equipment engineered to meet your exact needs.

CHALMERS

A-4907

ROSS EXCHANGER

cools oil while this Giant Hufford Uniwelder joins 20 inch tubing

Designed to handle the biggest job ever performed by the uniweld process, the 200-ton Hufford Uniwelder (shown) welds tubing up to 20 inches in diameter and 2 inches thick.

An important component of this welding giant, a Ross Type BCF Exchanger holds hydraulic oil temperature in check. Pump slippage from overheated, thinned oil is thus effectively prevented and rated power insured. Says Hufford Machine Works, Inc., "Ross Exchangers are compact, easy to install and perform satisfactorily . . . We have been using them for several years."

Like Hufford, numerous manufacturers furnish Ross Exchangers with regularity on hydraulic machinery of every description: die casting machines, metal drawing presses, extrusion presses, gear shapers, powder metal presses and fluid drives.

Not only are Ross Exchangers unmatched in thermal efficiency and ruggedness, they're pre-engineered in a wide range of fully standardized sizes to meet most needs. For detailed information, request Bulletin 1.1K5. Ross Heat Exchanger Division of American-Standard, Buffalo 5, New York. In Canada: Kewanee-Ross of Canada, Limited, Toronto 5, Ont.

ROSS

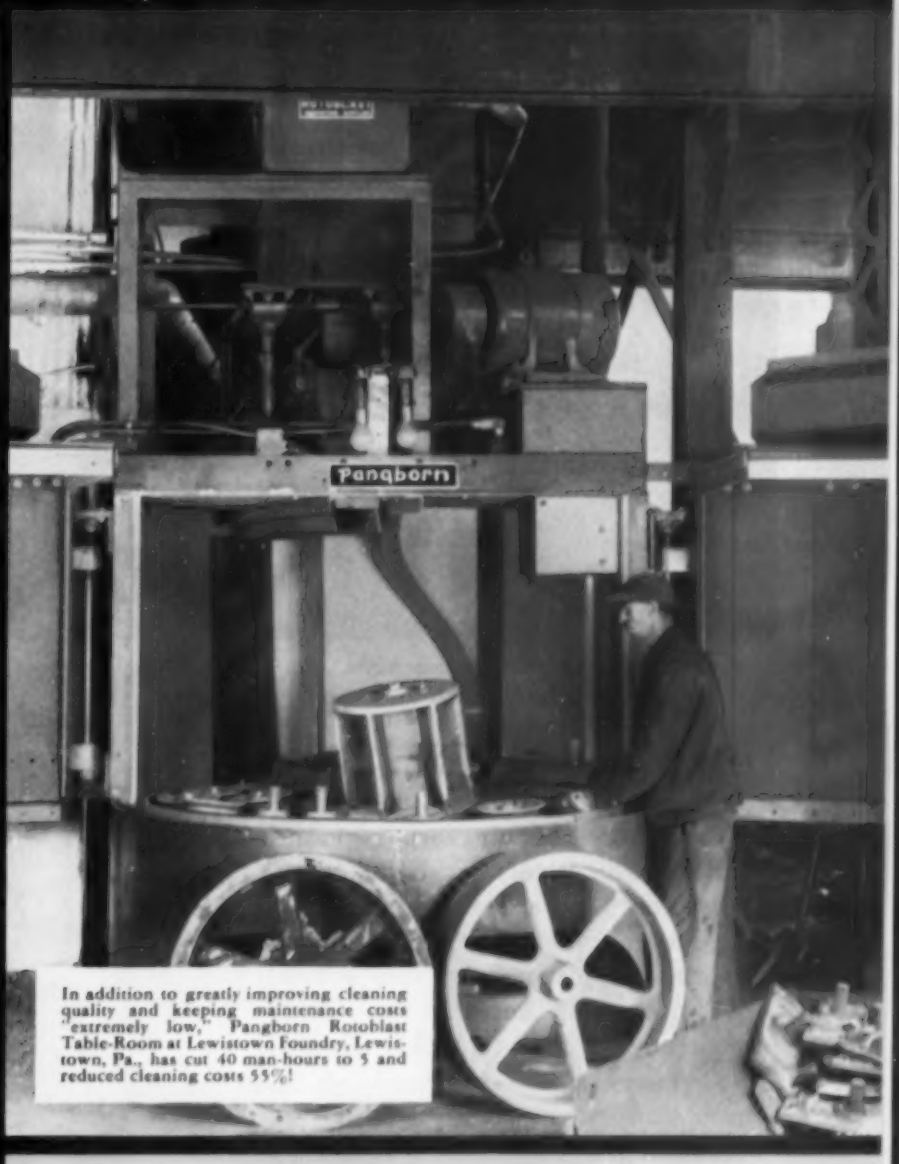
ROSS HEAT EXCHANGER PRODUCTS

Pangborn Rotoblast® reduces cleaning costs 55% at Lewistown Foundry!

One foundry says it "cuts labor costs." Another says it "reduces maintenance." A third says, "speeds production." Foundries that blast clean with Pangborn Rotoblast equipment can offer different reasons —and combinations of them—for Rotoblast's cost-cutting operation.

They all add up to one thing—*lowest cost per ton of castings cleaned!* That's because Pangborn Rotoblast cleans thoroughly, quickly, automatically. You get a finer, uniform finish on your jobs; power and labor costs go down; maintenance costs drop; production goes up.

Check your present cost per ton and then find out how Pangborn can *slash* your cleaning costs. Write for Bulletin 227 to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*



In addition to greatly improving cleaning quality and keeping maintenance costs "extremely low," Pangborn Rotoblast Table-Room at Lewistown Foundry, Lewistown, Pa., has cut 40 man-hours to 5 and reduced cleaning costs 55%!

And cuts labor costs in half at Keen!

Pangborn Rotoblast Table and Rotoblast Barrel at Keen Foundry, Griffith, Ind., clean *three times faster* than previous equipment, cut cleaning room labor costs 50%!

Pangborn

BLAST CLEANS CHEAPER

Rotoblast Blastmaster® & Continuous-Flo Barrel

Rotoblast® Tables & Table-Rooms

Special Blast Rooms & Cabinets

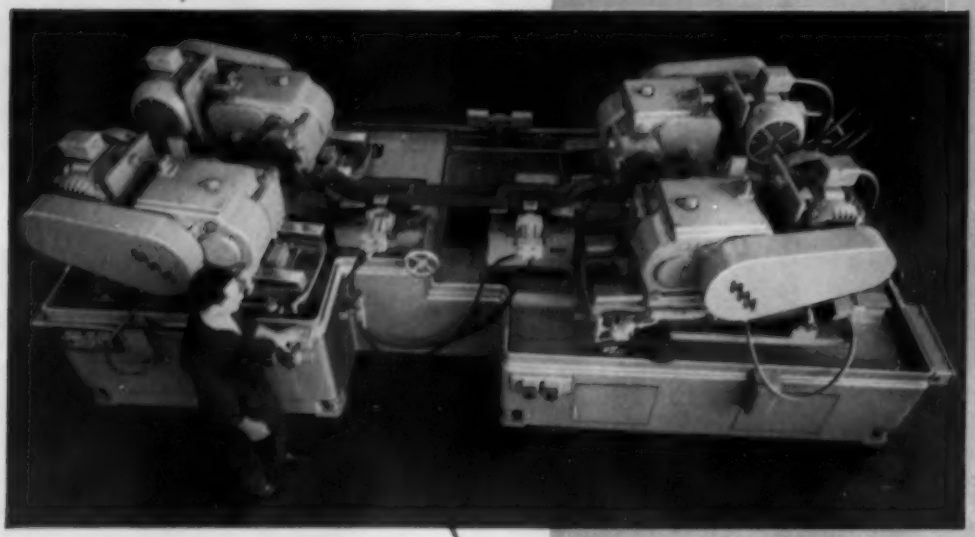
Pangborn Dust Control Equipment

Distributors for Malleabrasive and Tru-Steel Abrasives

MIGHTY BIG JOB

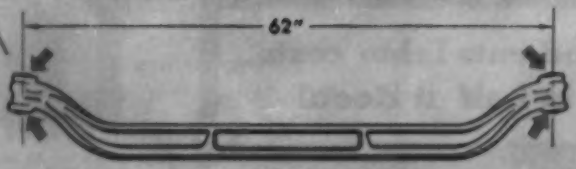
MINIMIZED by another

MOTCH & MERRYWEATHER *Production Solution*



Traveling head universal double duplex milling machine.

YOU'RE AHEAD WITH A HEAD FOR EACH SURFACE



Operation: Milling kingpin bosses of truck axle.
Material: . . . . . Forged steel.
Brinnel Hardness: . . . . . 217-255.
Machine cycle time: . . . . . 30 seconds

Four faces of a part are milled simultaneously by this universal-special machine. Mill faster, more accurately, at less cost with a head for each surface. Motch & Merryweather engineers can design universatility into special equipment. Thus, machines performing a specific task can be quickly adapted to a variety of sizes. Have M. & M. study your next job with a view to broadening the usefulness of ostensibly special equipment.

Write for Bulletin S-36 describing M. & M. Duplex Milling Machinery.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders of Automatic Precision Cut-off, Milling and Special Machinery

CALENDAR
OF MEETINGS

July 19-20, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach hotel, Chicago. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

July 25-28, National Tool & Die Manufacturers Association: Summer meeting, Stanley hotel, Estes Park, Colo. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Aug. 6-8, Society of Automotive Engineers Inc.: National west coast meeting, Mark Hopkins hotel, San Francisco. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 7-8, National Screw Machine Products Association: National sales conference, Wade Park Manor hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Wernts.

Aug. 21-24, Western Electronic Show and Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Information: WESCON, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Sept. 7-9, Metal Powder Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-13, American Institute of Chemical Engineers: Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-13, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 343 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and materials exposition, Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Sept. 13-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 18-22, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

NOW ...Wire of High Finish for Electroplated Products in Many Shapes & Sizes

Bright, Smooth No. 3 Finish takes Plating Beautifully—Adds Eye-Appeal to Your Products

Continental's new technique for producing #3 finish flat and special shaped wire offers you a range of standard and special wire shapes with a satin smooth finish for electroplating purposes. Previously, only flat wire with a surface suitable for high polish electroplating was obtainable . . . but now from Continental you can specify #3 finish in flat, square, rectangular, oval, and other shapes on inquiry, in practically any size, temper, and analysis in low carbon and medium low carbon steels. Here is extra "eye-appeal" for moldings, product trim, or wherever a formed plated wire component is required. Send us a blueprint of your part, or mail the coupon below for complete information without obligation. Telephone or write today.

SPECIALISTS IN WIRE
FOR OVER HALF A CENTURY

CONTINENTAL
STEEL CORPORATION
KOKOMO, INDIANA

PRODUCERS OF:
Manufacturer's wire in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

FILL OUT AND MAIL TODAY

Gentlemen: Please send us complete information concerning the new Continental #3 Finish Wire for Electroplating.

NAME_____
TITLE_____
FIRM_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

...this

modern CINCINNATI PRESS BRAKE...

gets the orders

at MARION MACHINE, FOUNDRY & SUPPLY CO.
Marion, Indiana

This Cincinnati Press Brake immediately produced orders in a highly competitive jobbing market.

A $25,000 job, which previously would have been lost, was profitably handled. A 3" channel with 2¾" flanges was formed in six gauge material.

Investigate these modern design features for low cost production.

- **Centerline loading.**
- **Rigid, All-Steel Construction**
- **Deep beds and rams**
- **Interlocked construction**
- **Large, high strength radii—free of weld**
- **Ram elevation—complete with micrometer indicators**
- **Tilting ram adjustment**

Write for Cincinnati Press Brake Catalog B-4.

Photos courtesy the Marion Machine, Foundry & Supply Company, Marion, Indiana.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

Pumping Progress Report

FOR MECHANICAL ENGINEERS

An advertisement prepared by the Aldrich Pump Co., Member of Hydraulic Institute, U.S.A.

THE USE OF FLAMMABLE OIL as a hydraulic medium has two major objections — cost and the ever-present danger of fire. Providing a system that would overcome these objections was the problem presented to Aldrich Engineers by a manufacturer of die-cast parts for the automotive industry.

MAKE-UP OIL COST, for this manufacturer, was almost unbelievably high. The fire risk was great. Despite the best efforts of safety control, flash fires were inevitable.

ONE SOLUTION was to pump water as the hydraulic fluid. But the manufacturer knew from experience that an ordinary pump couldn't do this job. What would we recommend?

WATER AS THE HYDRAULIC MEDIUM was our answer. And because Aldrich Direct Flow Pumps can pump water successfully, this manufacturer now operates a low cost, fire-free central hydraulic system. This die-caster gained other advantages by changing to his Aldrich-engineered central system. Aldrich Direct Flow Pumps feature fluid-end sectionalization, with a greater economy of maintenance and repair than was previously possible, horizontal valve action, parts standardization and simplicity of construction.

ALDRICH ENGINEERS will gladly consult with you on any pumping problem. Data Sheets describing the Aldrich series of Direct Flow Pumps will be sent to you on request. Ask for Data Sheet

63 — 2½" Stroke, 25 hp. Triplex
64A — 3" Stroke, 50 hp. Triplex
64, 64B — 5" Stroke, 100 to 200 hp. Series
67A — 6" Stroke, 300 to 900 hp. Series

Address your request to: The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.

2½" Stroke, Triplex "POWR-PAC" Pump

...for your tough pumping problems specify ALDRICH

Solving tough pumping problems has become a specialty with Aldrich. Today, manufacturing plants from coast to coast are performing routine pumping assignments around the clock that were once real headaches for project and plant engineers.

Aldrich Direct Flow Pumps, the basis for solving most of these problems, feature design innovations that provide economies of operation, maintenance and repair in addition to performing jobs not possible with ordinary pumps. If you have a pumping problem, pass it on to us.

TYPICAL METAL WORKING APPLICATIONS FOR ALDRICH PUMPS:

Descaling — Die Casting
Roll Balancing — Press Operation
Hydraulic Testing

Write today for Data Sheets describing the Direct Flow Pump Series.

THE ALDRICH PUMP COMPANY

Originators of the Direct Flow Pump
18 PINE STREET
ALLENTOWN, PA.
Representatives in principal cities

For modern living... the style is Stainless!

A rich, lustrous and, above all, serviceable metal that denotes quality at its finest . . . that's Sharon Stainless Steel.

Nothing looks so well so long as stainless steel, but, more important, modern living standards demand a metal that will resist denting, corrosion, road abrasion and pitting. Stainless is beauty all the way through. It's not a softy with a thin skin.

This maximum utility plus excellence of finish and consistent uniformity, coil after coil, have been big reasons why Sharon has remained a leading supplier of stainless steel to the automotive industry since the very beginning.

SHARON Stainless Steel

SHARON STEEL CORPORATION *Sharon, Pennsylvania*

DISTRICT SALES OFFICES: Chicago, Cincinnati, Cleveland, Dayton, Detroit, Grand Rapids, Indianapolis, Los Angeles, Milwaukee, New York, Philadelphia, Rochester, San Francisco, Sharon, Seattle, Montreal, Que., Toronto, Ont.

Multiple sources for "Things" not called SPRINGS

Yours to put to work . . . . our mechanical ingenuity and craftsmanship . . . . experienced in producing an infinite variety of metal parts in such fields as automation, communication, medical, electronics, safety devices, product development, etc. The capacity of ASC springmaking minds and machines is unlimited. Ask any Division to examine your sample or blueprint.

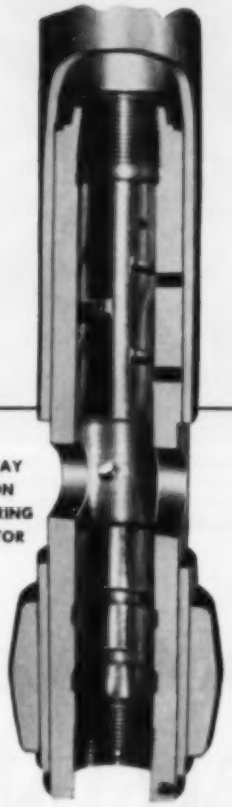
Divisions of

ASSOCIATED SPRING CORPORATION

MICROHONING*

with self-dressing abrasives generates consistent *Functional Surface Finishes*

Microhoning, the low-velocity abrading process consistently produces part after part exactly to your specified surface finish requirements, because the abrasive grits always remain sharp.



CUTAWAY SECTION OF STEERING ACTUATOR

Monroe Auto Equipment Co. designed its power steering unit to withstand rugged use while maintaining sensitive control. In the final processing of the hydraulic steering actuator, Monroe chose Microhoning to obtain diametric accuracy, consistent finish and to generate geometric precision.

The rough and finish Microhoning operations removed .005" stock from an interrupted bore 1.125" in diameter and 6⅜" long.

MATERIAL AND HARDNESS: SAE 1118 steel, Rockwell 45-50C

TOLERANCES: size—.0003"
roundness and taper—.0001"

FINISH: 25 microinches or less

CYCLE: rough Microhoning—35 to 40 seconds
finish Microhoning—15 to 20 seconds

MACHINE: Double-column Model 740 Hydrahoner

SELF DRESSING ACTION OF THE ABRASIVES . . . is accomplished by the rotation and reciprocation of the Microhoning tool—the combined motion continuously changes the direction of force on the abrasive grits and keeps them dressed.

EFFICIENT STOCK REMOVAL . . . results from the many sharp-cutting grits acting simultaneously over a wide area of work surface. In this manner, the effect of heat is also minimized. Of all production processes, Microhoning least disturbs the sub-surface structure of the work.

FUNCTIONAL SURFACE CHARACTERISTICS . . . are obtained in one uninterrupted cycle. Microhoning generates accuracy within millionths of an inch . . . surfaces free of waviness, taper, out-of-roundness and structural stresses . . . uniform surface finish and a cross-hatch pattern for best lubrication, sealing and wear characteristics.

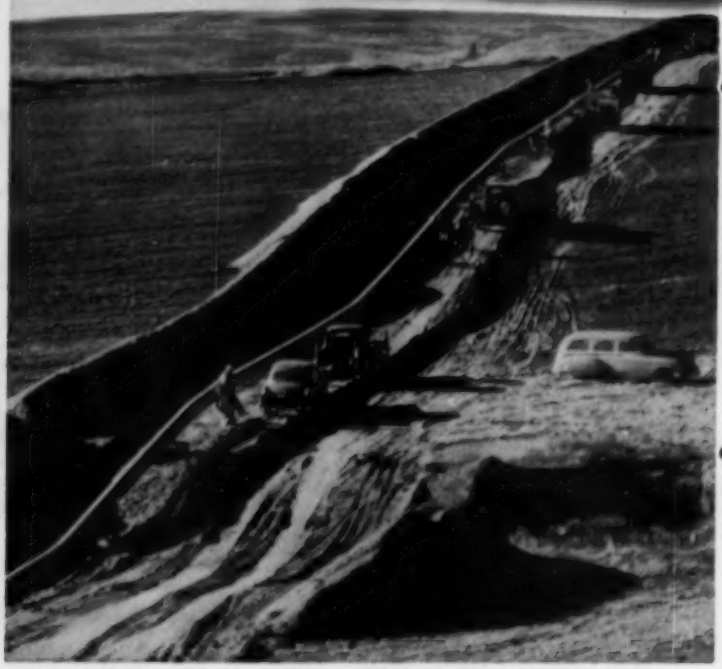
For more details on this application write for CROSS-HATCH Vol 8, No 1

***MICROHONING = STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH**

MICROMATIC HONE CORPORATION

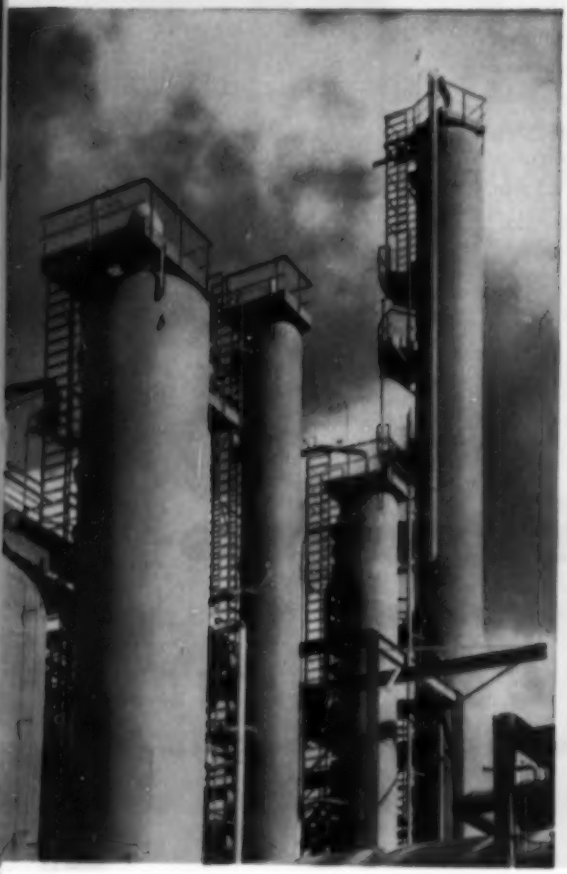
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

NATIONAL SEAMLESS STEEL BOTTLES go underground to store gas the modern way. Safe from all surface hazards, each 39-foot, 3-inch bottle, 24 inches in diameter, will hold 25,000 cu. ft. of gas at 2,240 p. s. i. Before shipment, each bottle is subjected to a high pressure hydrostatic test, assuring the ultimate user safe, long-time service.



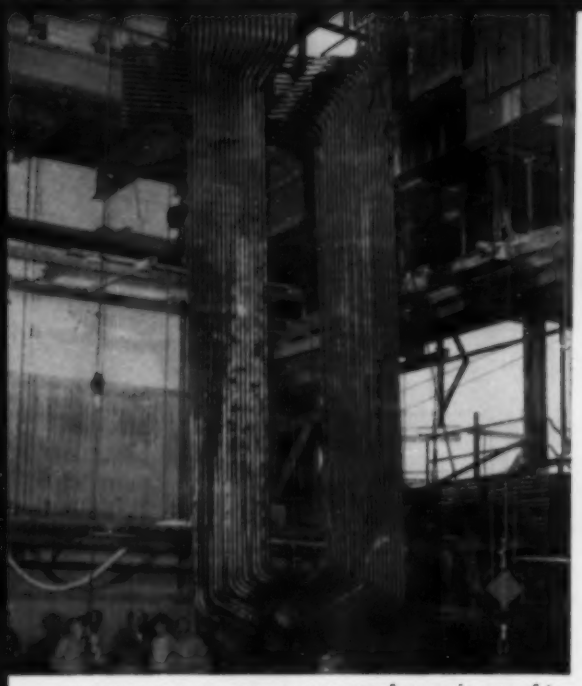
IN THIS 625-MILE PIPELINE, from Wyoming to Missouri, are 45,000 tons of National Seamless Pipe, in sizes of 20, 22, and 24 inches O.D. Service Pipe Line Company laid the line to bring crude oil from the Rocky Mountains to midwest refining centers. Outlet capacity of the line can reach 245,000 barrels per day.

REFINERIES RELY ON 2 DOZEN DIFFERENT ANALYSES made available by National Tube—each designed to handle specific refinery conditions such as corrosion, oxidation, high and low temperatures, and pressures. Other chemical compositions are also available in tubular products, and a wide variety of high temperature problems are now under study.



BACKBONE OF A NATIONAL

THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.



SUPERHEATER COILS BEING POSITIONED for use in one of today's modern giant superheaters. Here, steam at more than 2000 psi is superheated to 1000 F. Severe as this duty is, it poses no problem for National Seamless.

THE 100-TON B-47 STRATOJET has a heavy-duty landing gear, consisting of dual main wheels in tandem which support the fuselage, and single outriggers attached to the inboard engine pods. The outer cylinder of each of these rugged outrigger struts is fabricated from cold drawn tubes of National's Shelby Seamless Mechanical Tubing.

HUNDRED INDUSTRIES...

Seamless Pipe and Tubes

When a giant B-47 Stratojet lands "hard," the undercarriage must absorb a tremendous shock. And when boiler tubes are installed in a modern power plant, they've got to stand up for a long time, under terrific pressures and temperatures. In such applications, where high strength, complete dependability, and long life are so very crucial, you'll always find USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest degree such vital qualities as strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes promise smooth installation and long satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot is produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

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USS National Seamless Pipe and Tubes

UNITED STATES STEEL

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New Iron-Powder Low-Hydrogen Electrodes

for high-speed all-position welding

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P&H Iron Powder-Low Hydrogen Rods are recommended for welding of heavy sections exposed to severe shock and abuse. They give you welds of X-Ray quality with good impact properties at low temperatures. Moreover, you get smooth fillets without special effort.

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MATTISON
HIGH-POWERED
PRECISION

IF IT'S A FLAT SURFACE
THERE'S A MATTISON
TO GRIND IT!

GRINDING METHODS

Increase production, slash setup time in switch from planer to surface grinder!

Here's how high-powered surface grinding cuts costs in the plant of a large midwestern manufacturer of precision tools.

Broach inserts, formerly planed, are now ground on the Mattison Model 400 Vertical Spindle Reciprocating Table Surface Grinder. Production has been increased because this heavy, powerful machine removes so much stock, milling time has been reduced. Former production was 200 inserts per week on the planers—today inserts are ground at the rate of 700 per week! Whereas setup time *was* 45 minutes per load, now it takes only 50 minutes to set up and grind 20 pieces.

This grinder also is used for toolroom and maintenance work. An example is the job at the right—grinding large, 60 in. clamping fixtures for the toolroom.

"Mattison-equipped"

subcontract shops

can help solve your

machining problems

High-powered Surface Grinders prove small shop versatility!

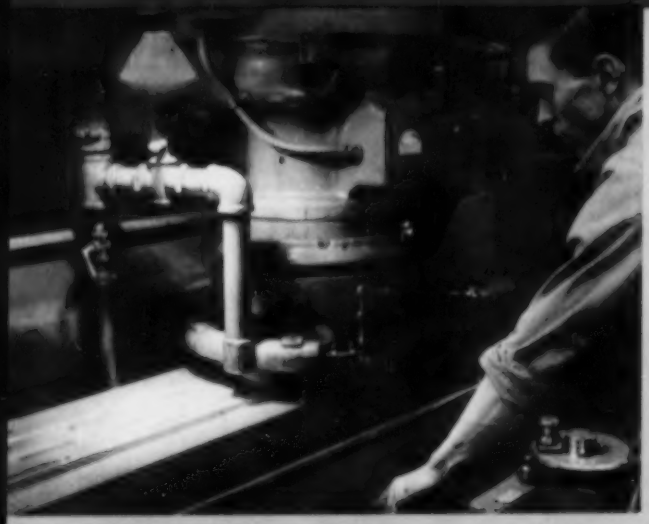
Chicago Grinding and Machine Company, Chicago, Illinois, is one of hundreds of small plants throughout the country using Mattison Surface Grinders for precision machining of subcontract parts. Starting with their first "Mattison" in 1939, this company now has three No. 36 Vertical Spindle Rotary Surface Grinders and one High-Powered Horizontal Surface Grinder—machines which permit a small shop to handle diversified operations accurately and fast.

The jobs illustrated here prove the unusual versatility of Mattison Surface Grinders—versatility resulting from extra-heavy construction, high power, and simplicity of adjustment.

Large cast steel machine ends are ground top and bottom in six hours each, removing ½ in. stock. Parallelism over 47 in. dimension is held within .0015 in. Because of an obstruction, one side must be ground across the short dimension, and then "blended."

Mattison No. 36 grinds two sides of precision retainer rings at the rate of 100 per hour, holding size to plus .000 minus .003 in. Power and rigidity permit grinding these parts with only a slight wheel tilt, combining best stock removal qualities and maximum accuracy.

SELECT THE RIGHT GRINDER FOR YOUR JOB FROM MATTISON'S COMPLETE LINE OF



Large 48 in. and 36 in. shear blades are ground on the Mattison "No. 300" because it is 25 per cent faster than other grinders available in this plant. Aircraft counterweights are ground to plus or minus .0005 in. over their 15 in. length.

Material costs controlled by high-powered surface grinding

Machining metals worth up to $12.50 per lb is a precision job, and waste is prohibitive. In this plant, ***seven*** Mattison Surface Grinders are used for a variety of operations to control quality and costs. Minimum stock allowances reduce material costs and speed machining. Power of the Mattison Grinders promotes positive cutting action, prevents heat checking, and reduces scrap costs.

Large clutch plates ground with ease

At the right, large clutch plates are finish-ground in 20 minutes, holding size within .002 in. Plates have a 12½ in.-wide uninterrupted surface. For accuracy, the wheel must be set perfectly flat. Powered by a 60 hp spindle motor, the "Mattison" removes .020 in. stock and maintains high unit pressures for free-cutting action. There is no "rubbing" or excessive heat because the "No. 36" has the rigidity to maintain high unit pressures when grinding large, flat surfaces—characteristics that assure removal of stock at profit-boosting speeds.

Variety of work produced on Mattison high-powered surface grinders includes die blocks, machine parts, machine tool beds and tables, and many other low- and high-production jobs.

Can subcontract grinding help you?

Hundreds of "Mattison-equipped" subcontract shops like Chicago Grinding and Machine Company are anxious to pit their special grinding skills against your "trouble" jobs. These grinding specialists can machine almost any flat piecepart at high-production efficiency, producing an unusually accurate and fine surface finish. If you are now machining flat surfaces by other methods without completely satisfactory results, we will be glad to suggest several subcontract grinding shops with equipment capable of doing your job.

60 DIFFERENT MACHINES • SURFACE GRINDERS • FACE GRINDERS • DISC GRINDERS

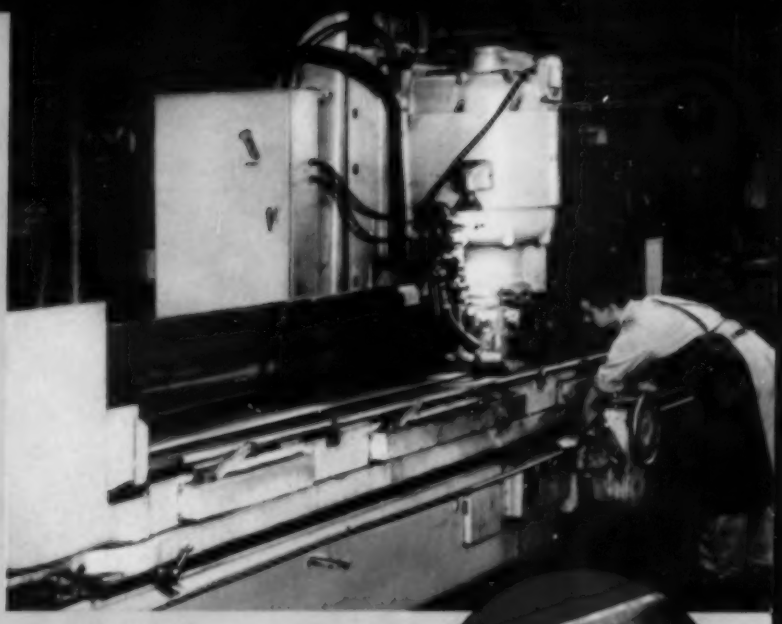
Accuracy and production increased 100%

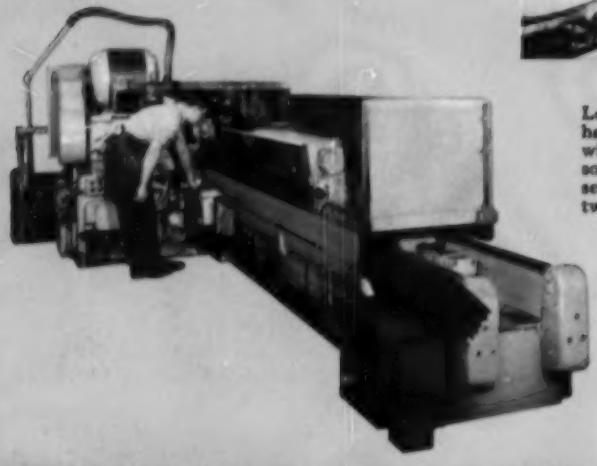
Both production and accuracy were increased 100 per cent by this Mattison user who grinds knives for paper-cutting equipment. Chrome-vanadium blades are difficult to grind because of the tough, low-carbon steel backing. Yet, flatness and straightness are held on the rough grinder within plus or minus .0015 in. Tapers are finish-ground to within plus or minus .00025 in. and concave surfaces are held to within plus or minus .0002 in.—results made possible by Mattison's exclusive double-column construction and high-powered design.

MATTISON
HIGH-POWERED
PRECISION
GRINDING METHODS

Increase production, improve quality, and reduce costs!

Mattison No. 400 Vertical Spindle Reciprocating Table Surface Grinders proved their profit power for this well-known manufacturer of industrial saws, paper-cutting machine knives, and files. Production has been increased with a resulting reduction in unit cost, and maintenance has been cut to a minimum.



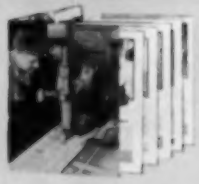


Low carbon steel blades are long and hard to handle, but they are ground with ease and accuracy on the Mattison. Ease of loading has helped reduce setup time and brought downtime between loads to the lowest possible point.

Left, bevels are ground on Mattison Traveling Table Face Grinder, with swiveling-type magnetic chuck for setting work at proper angle. These machines, particularly suited for face, knife, and shear-blade grinding, are available in table sizes up to 180 in. long.

IF IT'S A FLAT SURFACE...THERE'S A MATTISON TO GRIND IT!

Cost-cutting ideas . . . for production and process engineers



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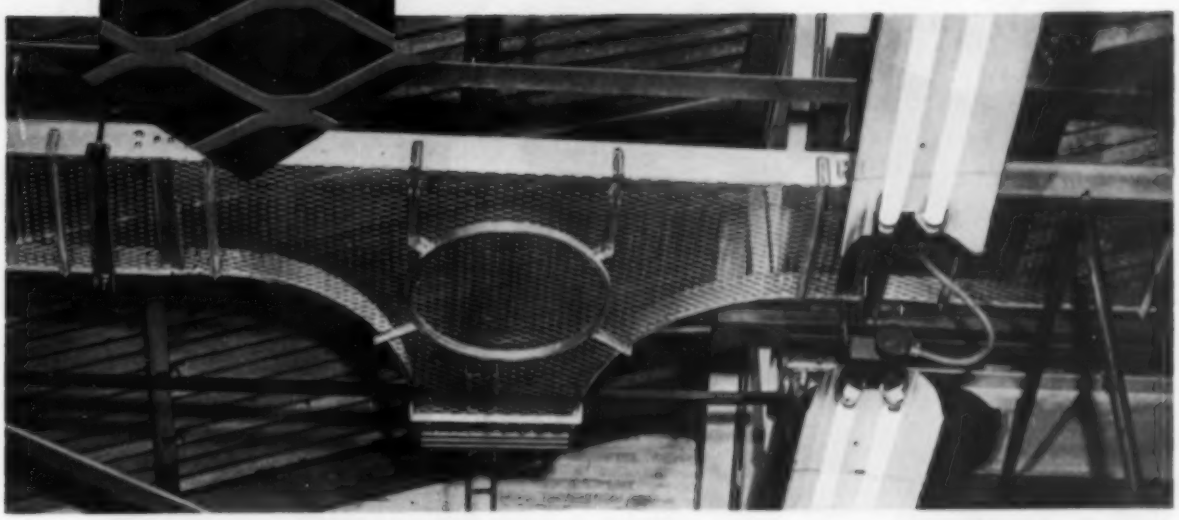
HIGH-POWERED PRECISION SURFACE GRINDERS

MATTISON MACHINE WORKS

ROCKFORD, ILLINOIS

light, strong, corrosion-resistant and low in cost—expanded aluminum makes fine cable baskets



Add up the advantages of Penmetal expanded aluminum and you can see why Husky Products, Inc. uses it for their line of cable baskets.

The extreme lightness of expanded aluminum . . . 80% lighter per square foot than the original sheet . . . makes the baskets easy and economical to handle and erect. Yet with plenty of strength to take the weight of the cables—thanks to the diamond truss pattern.

Corrosion-resistance makes for durability; sustained clean appearance. Low cost means large areas can be covered economically. Finally, expanded aluminum is easily cut or shaped or welded.

Cable baskets are another example of the profitability of Penmetal expanded aluminum. Take advantage of it in your designs and in your selling. Further details? Ask for folder 507-EM.

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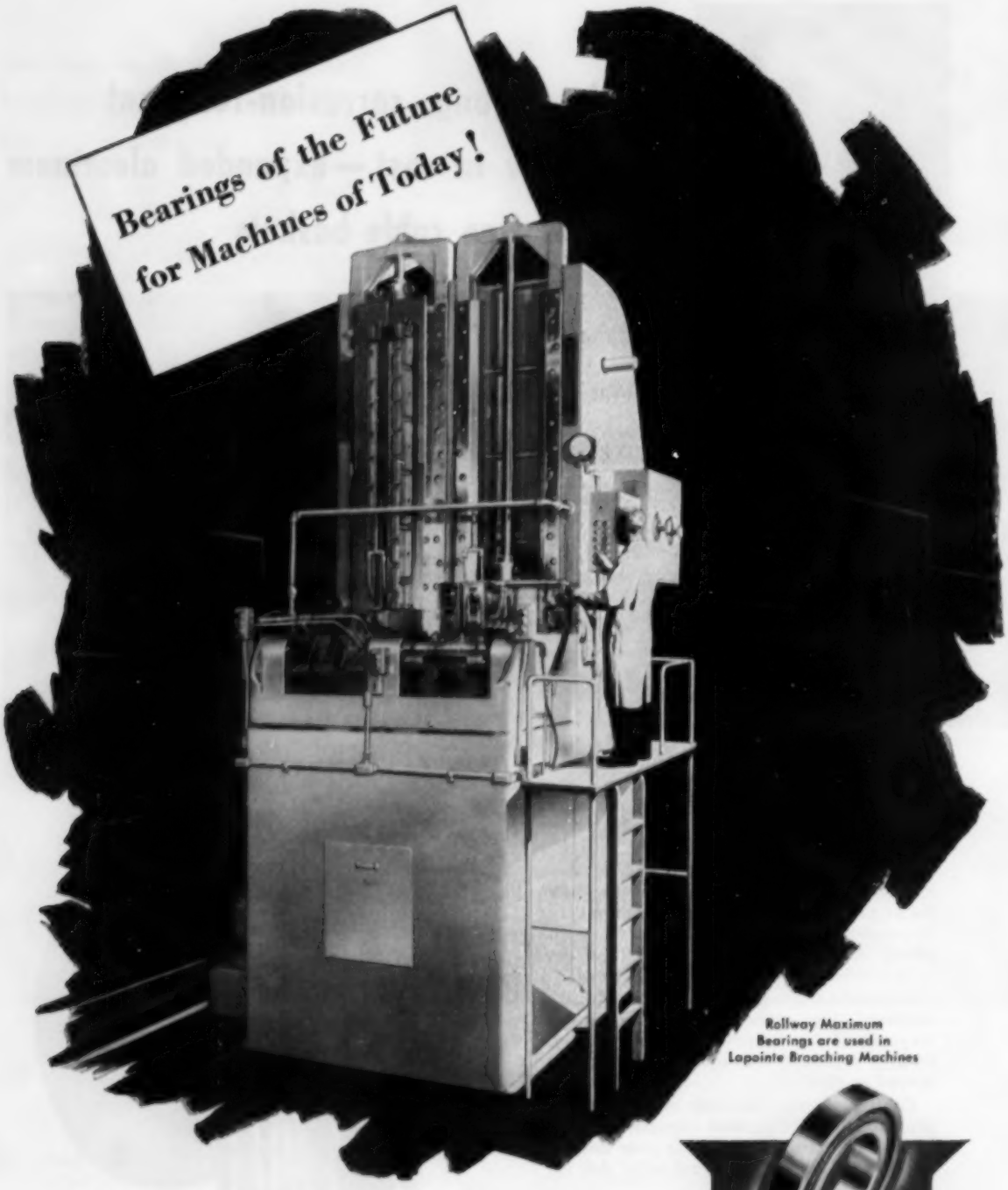
Penmetal

PM-105

The Baskets in the photos carry electric cables in power plants, industrial installations, etc. They were made from Penmetal ¾" flattened expanded aluminum—by Husky Products, Inc., Cincinnati, Ohio

Bearings of the Future for Machines of Today!



Rollway Maximum Bearings are used in Lapointe Broaching Machines

Rollway roller bearings regularly offer performance capabilities for more than the needs of today. They are continuously anticipating the operating requirements of years ahead.

Wherever bearing precision and load values are important in your plant or products — for original equipment or replacement service — call on Rollway *bearings of the future*, to give you the utmost performance in your machines of today. Rollway Bearing Company, Inc., Syracuse 4, N. Y. Manufacturers of a complete line of radial and thrust cylindrical roller bearings.

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TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

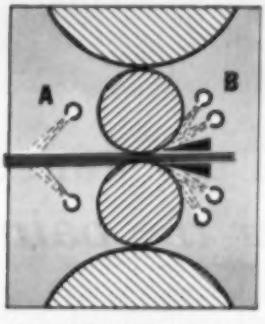
Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

Choosing work rolls for hot strip finishing trains

In continuous hot strip mill operation, the highest frequency of time-consuming roll changes usually occurs in the early stands of the finishing train. Conditions here are severe: the reductions taken are heavy, and the strip is still thick enough to carry much of its original heat.

Water: the secret of longer roll life—Banding is a chief cause of premature roll failure in these stands. This peculiar tendency is related to the amount and size of graphite in a roll's surface, and to the adequacy of the cooling system. At high temperatures, graphite tends to pull out of the surface, leaving tiny fissures. Rolling pressure then forces in small particles of scale. These offer footholds for further scale build-ups, which are rapidly rolled into elongated bands.

Thus, cooling is vital. Water should be applied at a pressure of 140-to-200 psi, and in such a way that a large volume actually reaches the roll surface. The nozzle arrangement should be designed to create uniform cooling over the entire work surface. In some cases, additional sprays on the pass line are necessary.



EFFECTIVE WATER APPLICATION includes high-pressure sprays (A) aimed against the strip to push the scale out of the rolls and high-pressure water (B) in large quantities applied to the roll surfaces as close to the point of contact with the strip as the mill design permits.

Choice of rolls can make or break a rolling schedule—Where it is impractical to cool the rolls thoroughly, it is still quite possible to minimize roll changing by using Mack-Hemp *Midland Superalloy* rolls. These are nickel-chromium-molybdenum alloy steel rolls containing no graphite and capable of being heat treated to high hardness levels. As a result, they are extremely resistant to spalling and fire cracking, affording no foothold for scale.

ROLL BANDING on hot strip mill work rolls is a principal cause of uneven gage across the width of the strip. It brought about the early removal of this pair of rolls.

Where rolls can be adequately cooled, *Mack-Hemp Nironite "F"* double-poured high-nickel grain rolls actually will roll greater tonnages than alloy steel rolls. The indefinite chill of the first pour keeps the graphitic content of the iron low near the roll surface, while the second pour produces a strong, ductile core.

For less severe conditions, the *Mack-Hemp Nironite A or B* grades of grain roll give an excellent account of themselves. Although they show more graphite near the surface, they frequently turn in surprising tonnages between roll changes.

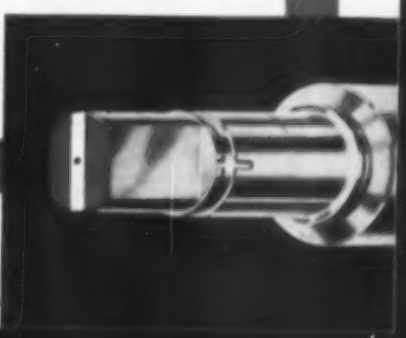
Mack-Hemp is as interested as you are in securing maximum output from your mills. If there are troublesome "roll-wreckers" among them, why not call upon us for help in selecting rolls to beat your special problems? There's no obligation. Write us today.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



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When you use Bonderite on your product, all these people go on your team to see that you get best results with greatest economy.

Want these good men on your side? Write Parker today!

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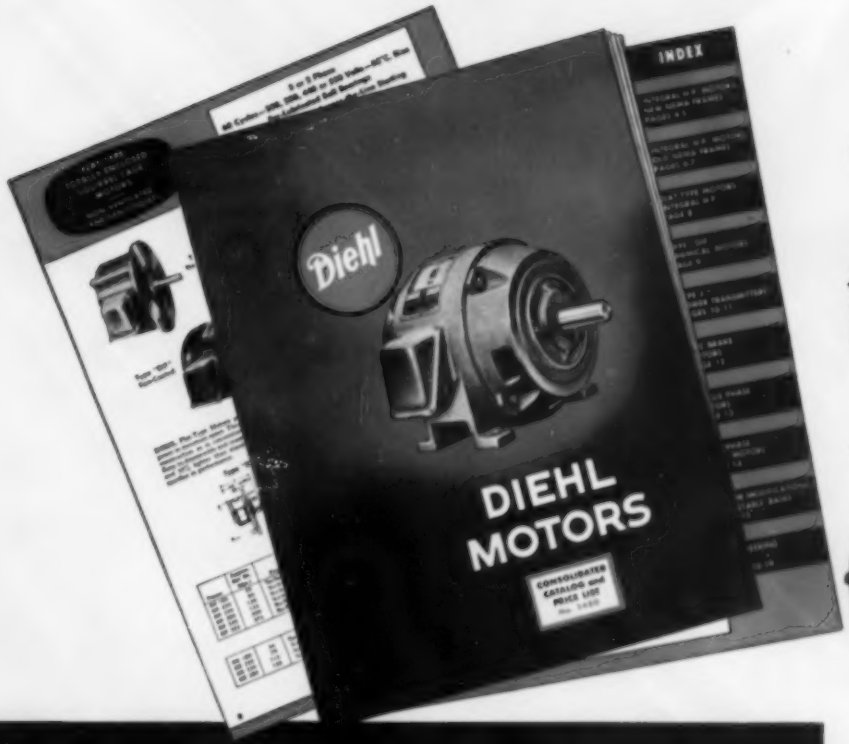

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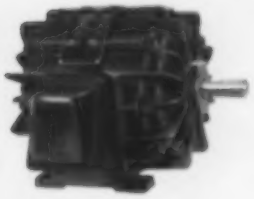

Type "DIF" Totally Enclosed Motors (Fan Cooled)

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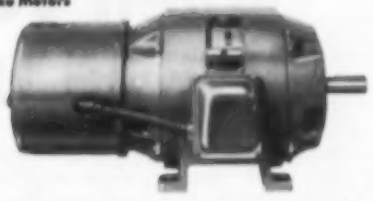
. . . to show you this varied line of superior motors

Type "DI" Magnetic Disc Brake Motors



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ALEMITE "POWER HOUSE" BARREL PUMP

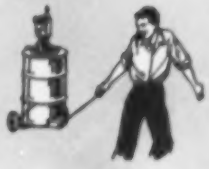
saves 95 man-hours for every 400-lb. drum of lubricant you use

Lubricating hundreds of bearings by slow, outgrown hand methods is a costly waste of time and money. A modern Alemite "Power House" Barrel Pump does the job much faster—at less cost. You save 95 man-hours for every 400-lb. drum of lubricant used. And because a completely sealed Alemite Barrel Pump system gives cleaner, more efficient lubrication, you make big savings right down the line. Savings in less down-time, and lower maintenance costs . . . in greater efficiency and output.

Air-powered Alemite Barrel Pumps fit directly into either a 400- or 120-lb. drum, send lubricant wherever it is needed anywhere in the plant. Or drum and pump can be placed on a dolly to go right to the machines. You get the big advantage of a completely sealed system. Lubricant reaches bearings "refinery clean"—no mess or waste.

• An Alemite Barrel Pump, either air or electric powered, is inserted in a fresh drum of lubricant. Lubricant is still sealed—"refinery fresh."

• Now the Barrel Pump supplies lubricant, through pipe, anywhere in the plant. Operator simply carries a hose and control valve to outlet, hooks it in, applies lubricant.



• Where piping of lubricant is not practical, power lubrication can be brought right to the machine by simply mounting drum and pump on a dolly.

ALEMITE

BARREL PUMPS

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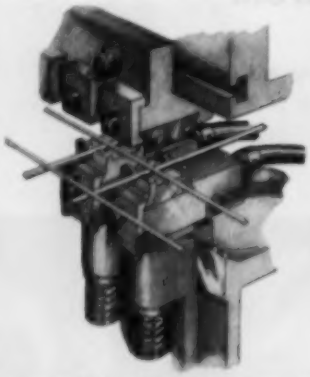
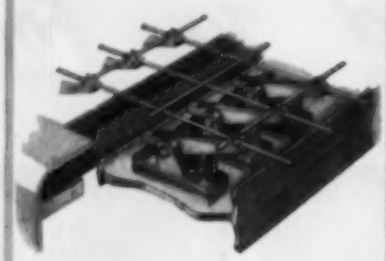


UNITIZED CONSTRUCTION of welding heads simplifies adjustment for mesh spacing and facilitates removal for maintenance. Up to 160 heads may be used.



FEEDER FINGERS advance the fabric between each series of welds. Position of the two sets of fingers is adjustable to suit the mesh spacing.

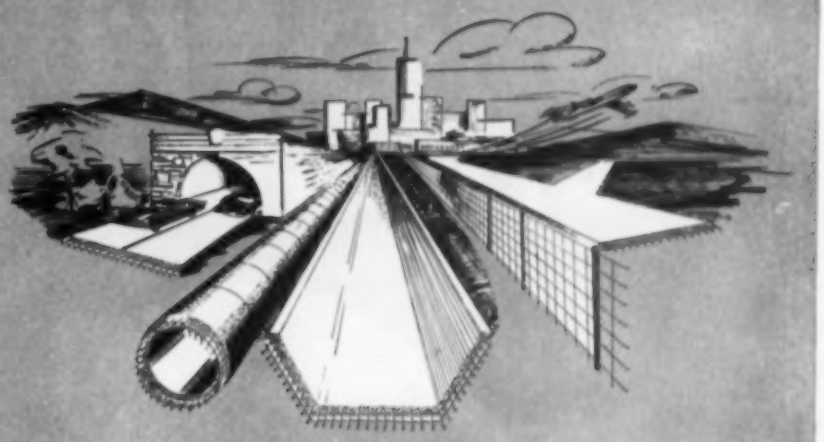
COIL UNLOADING is automatic. A full coil is shown moving out on the cradle which is designed for rapid unloading to permit continuous operation of the welder.

THE THOMSON WIRE FABRIC WELDER

turns out a mile of fabric every 90 minutes. Longitudinal wires are taken from coils, straightened in two directions, and fed to the welding station. Transverse wires are taken from a coil, straightened in two directions, fed into receivers, cut to length, positioned in the welding dies by "placer fingers", and welded at each intersection. "Feeder fingers" automatically advance the fabric through a selvedge trimmer and through the shear or to the coiler.

EVERYDAY USES OF WIRE FABRIC

Welded wire fabric is used to reinforce concrete highways, streets, sidewalks, floors, roofs, walls, beam wrapping, airport runways, pipe, irrigation canals, aqueducts, reservoirs and similar construction. It is also used as fencing, ranging from farm and lawn fence to poultry netting; for flooring, caging, partitioning and grillwork; and as the wire fabric component of many familiar products.



RESISTANCE WELDING
by the mile

An Example of Automation in the Production of Welded Wire Fabric

To supply the nation's appetite for welded wire fabric, Thomson has developed automatic welders which literally produce fabric "by the mile".

The giant fabric welder pictured here makes heavy concrete reinforcement. It turns out over a million square feet a week in widths from eight to sixteen feet in a wide variety of mesh spacing and wire gauges.

It takes the raw material in coils just as it comes from the steel mill and delivers the finished product in rolls or sheets. Rolls are mechanically off-loaded and sheets are automatically sheared into mats of specified lengths.

The Wire Fabric Welder is one of many types of special purpose welders for which Thomson is the recognized source throughout industry. It is also a fine example of automation applied to resistance welding.

A Thomson man will be glad to discuss with you ways to reduce or eliminate work handling in your resistance welding operations. Here is an area in which you can enjoy the advantages and economies of automation *right now*.

FOUNDED IN 1880 BY ELIHU THOMSON

INVENTOR OF RESISTANCE WELDING

THOMSON *Welders*

THOMSON ELECTRIC WELDER COMPANY, LYNN, MASS.

Thomson also makes a complete line of standard spot, projection, seam and flash-butt welders. Also, aircraft, brake shoe, shell and other special purpose resistance welders.

DEPENDABLE

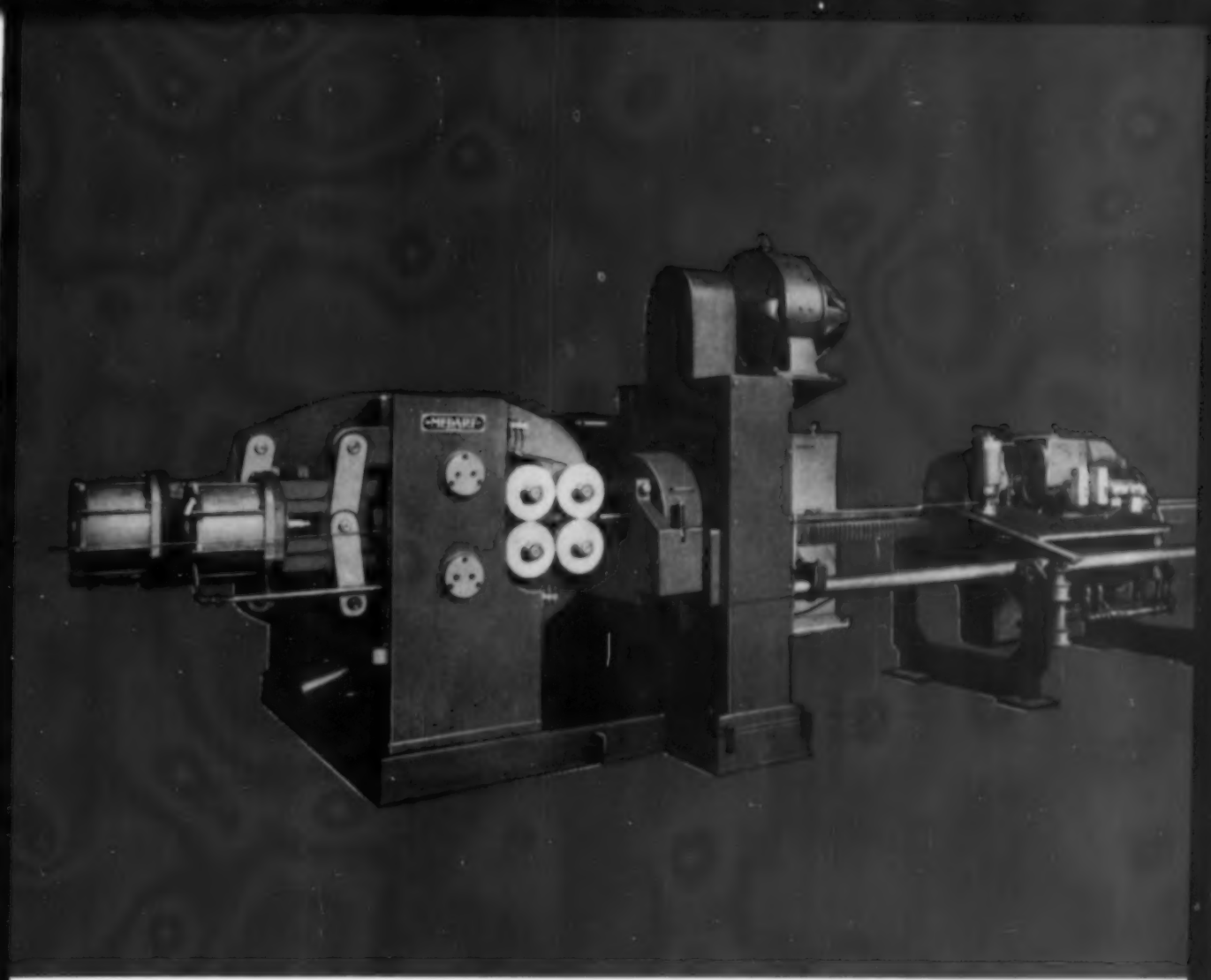
Quality

We figure there's nothing that foundries appreciate more, in abrasives, than uniformly high quality. So, that's what we shoot for in the production of SUPER-ANNEALSHOT. You'll find it a malleable shot of thoroughly dependable quality—the finest you've ever used. And, you'll also appreciate its low cost. Efficient mass-production permits our selling this outstanding abrasive at very reasonable prices. If you haven't yet tried SUPER-ANNEALSHOT—you should!

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

PRODUCING THE FINEST CHILLED AND MALLEABLE SHOT AND GRIT ON THE MARKET



BLAW-KNOX MEDART makes what it takes for high speed, carbide, centerless bar turning

The new Blaw-Knox Medart RFPD Centerless Bar Turner is designed especially to take advantage of higher cutting speeds possible with carbide cutting tools. One pass through the machine accomplishes a complete removal of surface defects and decarburization at high production rates. And you get 100% recovery in the form of chips.

A patented "torque chipping" device absorbs the twisting imposed on the workpiece by the cutting tools. This feature opens an entirely new field of turning small diameter bars. The workpiece is centered in the cutterhead regardless of variation in diameter by a pneumatically operated device on the roll feed. The workpiece is kept under positive tension by the pull-out carriage throughout the cutting action.

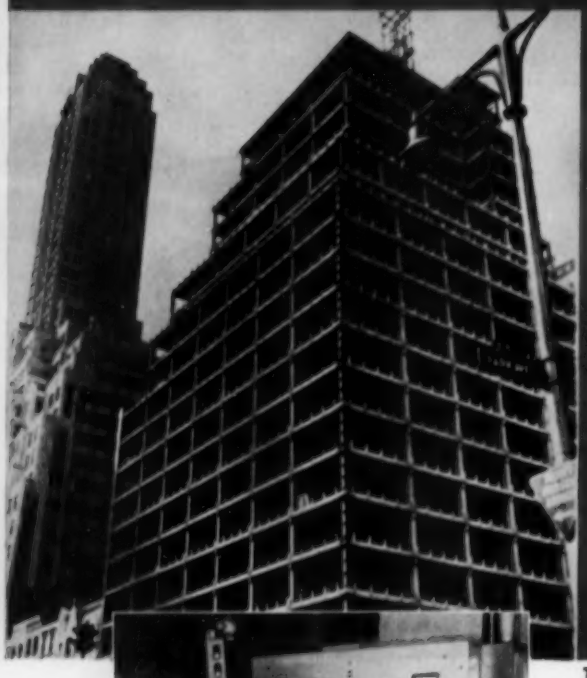
Blaw-Knox Medart fully automatic Centerless Bar Turners are available in sizes for turning ½" to 9" diameter bars. Call us for complete details, technical assistance or service.

50th Anniversary
BLAW-KNOX
1906-1956

BLAW-KNOX COMPANY
Foundry & Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

CONTINENTAL

Curtain Going Up!



The Marion Davies Building, New York, was completely enclosed in *10 hours*—through the miracle of anodized aluminum "curtain" walls. Giant two-story panels are manufactured by General Bronze Corp., using an **H-VW-M AUTOMATIC ANODIZING SYSTEM.**

General Bronze Corp. led the field when they anticipated the vastly increased use of anodized aluminum in the building industry. The same wisdom and foresight motivated General Bronze when they called on H-VW-M to supply their giant, streamlined new anodizing system. **H-VW-M DESIGNED, MANUFACTURED AND INSTALLED** it from beginning to end. And the benefits to General Bronze: tripled production . . . improved quality control . . . and the assurance that H-VW-M—the **ONE SOURCE** they chose—assumed **COMPLETE RESPONSIBILITY** for the entire system, from concept to production.

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.
Plants: Matawan, N. J. • Grand Rapids, Mich.
SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) Boston • Bridgeport • Chicago • Cleveland • Dayton • Detroit Grand Rapids • Los Angeles • Louisville • Matawan Milwaukee • New York • Philadelphia • Pittsburgh • Plainfield Rochester • St. Louis • San Francisco • Springfield (Mass.) Utica • Wallingford (Conn.)

H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

for dependable deliveries of cold rolled specialty steels —call CRUCIBLE

Crucible is geared to give you *reliable, on-time deliveries* of a wide variety of cold rolled specialty steels—carbon spring, alloy strip . . . coils or cut lengths . . . in the size, finish and temper you specify.

And you're sure of *quality* from Crucible—*fine finish . . . better edges . . . improved flatness.*

So, for prompt deliveries, timed to meet your production schedules—call Crucible. And, for handy reference—mail the coupon for your free copy of Crucible's 32-page fact-filled book on cold rolled specialty steels. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

Crucible Steel Company of America
The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

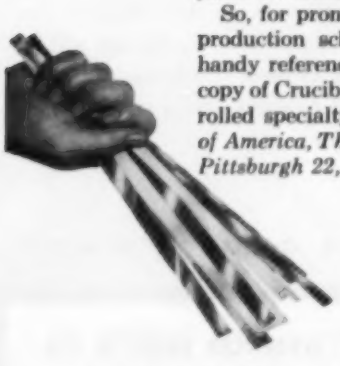
I'd like a copy of your 32-page booklet on cold rolled specialty steels.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____



CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

PRODUCTION MACHINERY

GREENLEE

Simplified

CROSS-SLIDE CAMMING

ON GREENLEE BAR AUTOMATICS

Gives You Greater Flexibility...Saves Setup Time

CAMS ARE INTERCHANGEABLE

CAMS ARE SMALL, EASY TO HANDLE

CAMS HAVE UNIFORM HIGH-POINT

Greenlee simplified camming results in simplified, fast setups. Operation is economical and efficient . . . especially so on short runs. Each cross slide operates independently by a separate cam . . . long operations are easily split up for greater flexibility and more effective use of machining time. On a Greenlee your investment in cams is held at a minimum . . . the same cams can be used on any cross slide. Greenlee engineers will be glad to show you how to reduce profit-stealing setup time on the simplified Greenlee. Take advantage of this valuable service now.

Do you receive a copy of the Greenlee "Automatic News" regularly? If not, write and ask to be placed on our mailing list. Give company name and job responsibility.

WRITE TODAY FOR CATALOG A-405

GREENLEE

GREENLEE BROS. & CO.
1927 Mason Avenue
Rockford, Illinois

FOR COMPLEX FABRICATION. In chemical plants, these Stainless Steel acid catchers are used to remove dilute sulfuric acid from gases. Continental Boiler & Sheet Iron Works in St. Louis fabricated the units. Notice the complicated curves in the helix plates, and the neat joinery . . . a tribute to fine craftsmanship and the workability of Stainless Steel.

FOR ABRASION AND CORROSION RESISTANCE. Oil can racks stand out in all kinds of weather, and the support strips are constantly rubbed and knocked by the heavy cans of oil. Modern Metal Products Company of Greensboro, N. C. makes the strips out of Stainless Steel so they will stay bright and new-looking, and never get banged out of shape.

NOTHING *can equal* *Stainless Steel*

In its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

FOR SANITATION. These Stainless Steel shelves are made by the Eastern Steel Rack Company, Boston, Massachusetts, for use in cold storage rooms. They are easy to clean, and offer a sanitary, corrosion-resistant surface for food products of all kinds.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

USS

UNITED STATES STEEL

EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation

Deliver the power over a wide range of temperatures

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

At few places on earth do storage batteries ever encounter such extremes of cold and heat as are used to test Exide-Ironclad Batteries in the laboratory.

These tests prove that Exide-Ironclad Batteries can be depended upon over a wider range of temperatures than they are ever likely to be asked to endure. And they provide tangible extra assurance of dependability at all the more normal operating temperatures.

Extreme temperature performance is especially important when a battery must have continuous dependability. It is often at these extremes that a battery is most needed. And a battery cannot be called dependable unless it can be counted on every day—all of the time.

The high and low temperature performance of Exide-Ironclad Batteries is a direct result of their unique construction features and special engineering. In countless applications, these batteries have earned an unmatched reputation for long life and high capacity. When you need batteries for heavy duty uses, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

Now available... new hollow aluminum bar stock

Harvey Aluminum hollow bar stock is now available for a wide variety of hollow-part machining jobs. The new bar stock offers material savings, speeds production, and drastically cuts chip handling and scrap waste. Made of a special Harvey aluminum alloy, the new bar provides exceptionally high yield strength and corrosion resistance, has excellent machinability and surface finish. For *most* applications, the cost of hollow aluminum bar is 20% to 30% *lower* than conventional solid bar . . . . because the hole is already there!

It will pay you to immediately investigate the wide range of sizes available. Write or call today to have your Harvey field engineer show you how to save time and money with the new hollow aluminum bar stock. *Harvey Aluminum, Torrance, Calif. Branch offices in principal cities.*

Harvey is a leading independent producer of quality aluminum products. Extrusions in all alloys and in all sizes, special shapes, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tube, impact extrusions, aluminum screw machine products and related products. Harvey is also producing similar items in titanium and steel.

Making the most of aluminum...

for everyone

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC., TORRANCE, CALIFORNIA • BRANCH OFFICES IN PRINCIPAL CITIES

HOW W. F. & JOHN BARNES

"Specials" Cut Costs on

Overall view of three 5-Way Machines. First machine in foreground, bores and faces 5 flange holes; second, performs 8 combination drilling and chamfering operations; third, handles 14 tapping operations. All three machines are equipped with power transfer from gravity conveyor. One operator loads and unloads three machines at pushbutton stations.

4-Way Machine with reciprocating index fixture. Left-hand two-spindle heads drill and finish-ream .750" dowel holes in both ends. Right-hand single stub-spindle heads bore, chamfer and face stator and cylinder ends.

View showing workpieces in center turntable after 180° turn, ready for traversing into new machining position. Machining cycle at station 2 allows operator time for unloading and loading at station 1 without losing production time.

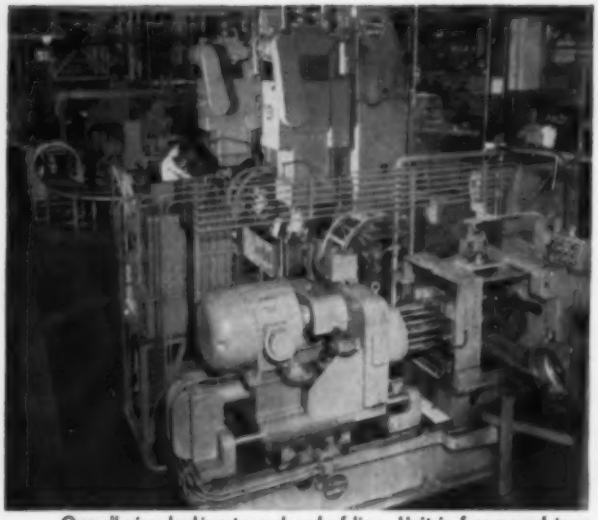
W. F. & JOHN BARNES

BUILDERS OF BETTER MACHINES SINCE 1872

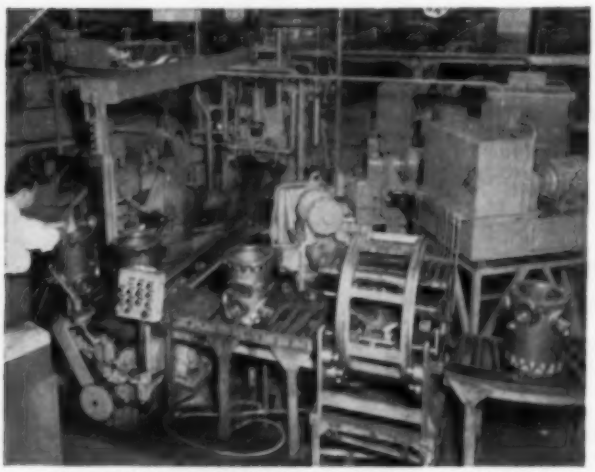
Special Machine Tools

Special Conveyor Units

Low Production Work



Overall view looking toward end of line. Unit in foreground taps 31 holes in ends of piece and presses in two center bushings. Vertical machines are facing units for machining stator end and hub, and cylinder end and hub.



View of 6-Way Boring Machine for finishing five cylinder bores and two babbited bushings. Concentricity of stator and crankshaft bores is held to max. of .005" T.I.R. Babbit chips are collected in separate chip box. C.I. chips for entire line are flushed automatically to a central system.

MULTI-STATION UNITS REDUCE MACHINING TIME ON COMPRESSOR CRANKCASES 1.85 HRS. PER PIECE

At Airtemp Division, Chrysler Corporation, Dayton, Ohio, a battery of ten Barnes Multiple Spindle Machines are today demonstrating the efficiency and economy of special machines engineered to serve relatively low production requirements. Previously, the compressor crankcases used in Airtemp's fine line of large 5-cylinder commercial air conditioning units were drilled, milled, bored, faced, and tapped in single operation machines. Now, most of these operations are performed automatically in Barnes specials. As a result, machining and handling time has been reduced 1.85 Hrs. per case. In addition, close tolerances are more easily maintained which has increased product quality.

PRODUCTION GEARED TO 15 CRANKCASES PER HOUR

The Barnes Multiple-Spindle Specials are incorporated into a semi-automatic production line which is geared to produce 15 crankcases per hour. Parts are moved between machines on gravity conveyors, and operators manually position workpieces into the loading station of each machine. Powered turnover and transfer devices are included to minimize manual effort. After more than 12 months of operation, the new line has effected savings equalling the preliminary estimates of Airtemp Engineers, and at the same time has provided the additional capacity to meet an increased demand for their product with little increase in floor space.

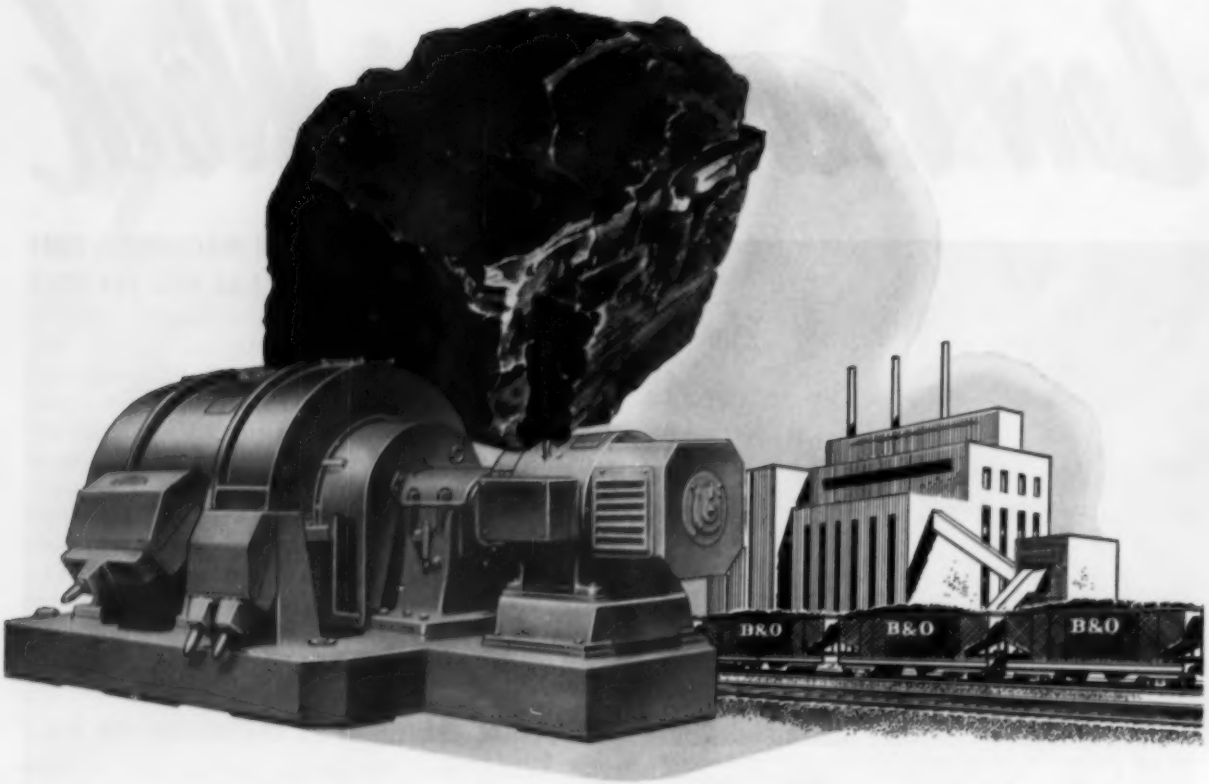
INVESTIGATE BARNES SIX-POINT COORDINATED MACHINE BUILDING SERVICE

We suggest you investigate the profit possibility of applying Barnes special machines to your work. Find out, too, how Barnes six-point coordinated engineering and building services can help you eliminate divided responsibility and save time. Write for free brochure or ask for an analysis on any specific job.

W. F. & JOHN BARNES COMPANY

434 SOUTH WATER STREET · ROCKFORD, ILLINOIS

Special Process Equipment | Special Electrical Controls | Food Machinery



Energy PRODUCER EXTRAORDINARY!

Coal-generated electric power is continually on the increase because Bituminous is economical and abundant. Billions of tons in proved reserves of bituminous for every purpose are available on the B&O. Mines operated with modern efficiency are prepared to provide the right coal for your specific needs. *Ask our man!*

LET OUR COAL TRAFFIC REPRESENTATIVES suggest the B&O bituminous you can bank on. Contact Coal Traffic Department—B&O Railroad, Baltimore 1, Md. LExington 9-0400.

BITUMINOUS COALS FOR EVERY PURPOSE

BALTIMORE & OHIO RAILROAD

BITUMINOUS COALS FOR EVERY PURPOSE

INGALLS furnishes STEEL MUSCLES

for the WORLD'S LARGEST POWER PLANT

This is the world's largest steam-electric plant, recently completed near Kingston, Tennessee, by the Tennessee Valley Authority. The entire plant has a capability of one million, six hundred thousand kilowatts — about fourteen times that of Norris Dam. With a generator room 895 by 115 feet, a boiler room 868 by 138 feet, and a shop and office area 200 by 205 feet, the main building of the nine unit structure is by itself tremendous; some idea of the whole plant's scope may be realized by considering the twenty two million man hours that went into planning, designing, construction, and secondary services.

View of turbine room in Ingalls-fabricated powerhouse; 7 units in operation; 150,000 kw units in foreground

INGALLS, specialist in steel for power plants, is genuinely proud of having been called upon to fabricate the structural steel used in the powerhouse proper for this monumental operation. It represents one more in a large series of power installations done by Ingalls in twenty two different states, throughout the North, South, East, and Southwest. Wide and intense practical knowledge makes Ingalls ready *now* to help you with both speed and true economy. Your inquiries will be promptly acknowledged.

FABRICATING STEEL IS OUR BUSINESS

THE INGALLS IRON WORKS COMPANY

BIRMINGHAM, ALABAMA

SALES OFFICES: New York, Chicago, Pittsburgh, Houston, Atlanta, New Orleans

PLANTS: Birmingham, Ala.; Verona, Pa.; Pascagoula, Miss.; North Birmingham, Ala.; Decatur, Ala.

Your Wickwire Rope distributor and our steel melter... always at your service

This steel melter—at Wickwire's open hearths where wire rope steel is made—is with your Wickwire Rope Distributor every time he makes a call.

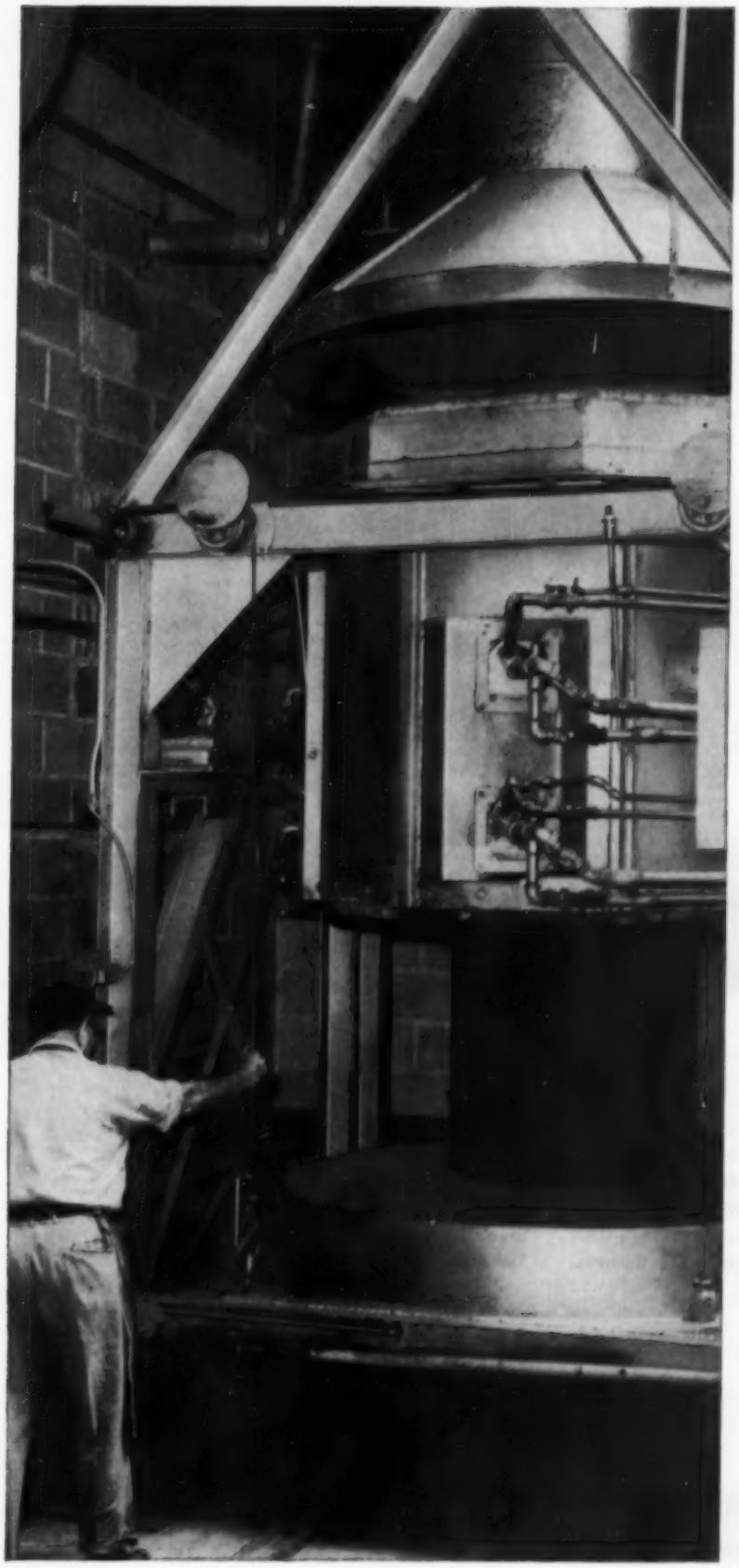
True, he's physically at the open hearth compounding steel with the sharp eye of an expert. But your Wickwire Distributor makes his call with the full assurance that the steel in Wickwire Rope has the right chemical content and grain size because it's always produced under rigidly controlled conditions by experts.

It's just one more reason why your Wickwire Rope Distributor knows he's got top-quality rope, slings and strand to sell ... and that these products will serve you well.

CF&I WICKWIRE ROPE A CF&I PRODUCT

4082

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION



"We get fast, easily controlled heat... thanks to *GAS*"

—Teiner Engineering Corp.
Malden, Mass.

Only Gas-fired equipment can supply proper heat processing for the important operations of metal melting, shell molding and hydrogen stress annealing at the Teiner Engineering Corporation, supplier to many of the nation's foremost electronic firms.

C. R. Hood, at Teiner, explains, "Gas is dependable, accurately controllable, and highly satisfactory for our most important operations. What's more . . . Gas is fast, clean and easily handled."

Speed, cleanliness, and the many other advantages of Gas, can be yours, too. For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss with you the economies and results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

This special Gas-fired furnace makes easy work of the hydrogen stress annealing essential to high fidelity operation of electronic circuits.

16 surfaces

...on this Garrison Gear Chuck

THE BODY
(soft semi-steel)

THE CONTROL RING
(soft tool steel)

AND THE 6 JAWS
(hard tool steel)

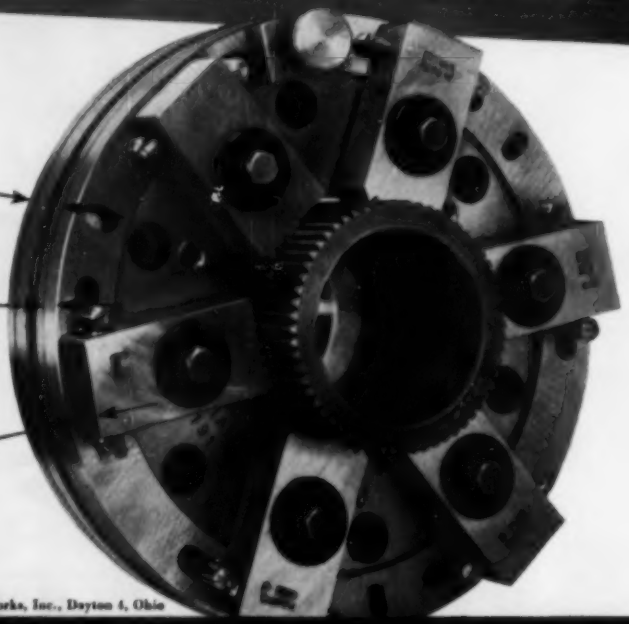


Photo courtesy of Garrison Machine Works, Inc., Dayton 4, Ohio

are Blanchard ground for precision

As every machinist knows, machine tools impart their precision through their chucks. That's why chuck dimensions and tolerances are of critical importance . . . and why Blanchard Surface Grinders are commonly used to produce the flat surfaces required.

Blanchard Surface Grinders are ideal for all kinds of precision grinding jobs. They produce extremely close tolerances for flatness, size and parallelism . . . *at low costs and high production rates.* Many Blanchard users grind surfaces flat to within 2 to 4 light bands, parallel to less than .0001", with dimension tolerance of .0002", and surface finish to better than 3 micro inches.

Whether your work involves precision machining or rapid removal of stock, take the advice of master machinists . . .

PUT IT ON THE BLANCHARD

No. 11 Blanchard Surface Grinder

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

NOW...

an EXTERNALLY WRENCHED SCREW

that can be used in *standard*
counterbored holes with *standard* wrenches

THE FERRY CAP

countr-bor®

SCREW

For counterbored or other socket head screw applications, external wrenching instead of internal wrenching means:

- More gripping surface
- More torque
- More savings

TRY THEM—

Save knuckles—save time—save costs.

Solve simply the tough assembly problems and improve appearance where socket screws are required.

Send for samples.

You'll receive prices, complete information and samples promptly upon request.

Any type socket wrench handle with standard 12-pt. socket is used for counterbored applications.

Ferry Cap Countr-Bor Screws
PATENT APPLIED FOR
MANUFACTURED SOLELY BY

THE FERRY CAP & SET SCREW COMPANY
2159 SCRANTON ROAD • CLEVELAND 13, OHIO

...being delivered to plants where speed and flexibility are demanded

DESIGNERS AND BUILDERS OF:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
(Metalworking and Extrusion)
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

• The 250-ton Press on the left has been delivered to Continental-Diamond Fibre Co., the center Press will operate at 250-ton capacity for Mica Insulator Company, and the 1500-ton Double Action Press on the right is now increasing production for the Wyman-Gordon Company. What sold these presses? Was it the desire for new production highs, or greater stamping accuracy, or greater production control? Or it might have been the important need for reduced costs made possible by the specialized knowledge and experience of our engineers. Call your BIRDSBORO representative, he'll be able to give you the details of the benefits you seek . . . *and get* when you specify BIRDSBORO Presses.

HP-27-56

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

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GLAD I CALLED IN "ELL" AND "ESS"!

No, this isn't a junk man's dream.
These are just the parts for a new product—*without* bolts and nuts!
And it's about time our friend called in "ELL" & "ESS"
for expert advice on *how to fasten it*".
Selection of the *right* fastener for the job at hand is important in many
ways: assembly efficiency on the production line, ability to do the
holding job at minimum cost and smooth operation of the finished product.
Consumer products must also have "sales appeal" appearance.
So don't guess—Call in "Ell" & "Ess". There's no
charge and they may save you a pretty penny!

The LAMSON & SESSIONS Co.

1971 West 85th Street · Cleveland 2, Ohio
PLANTS AT CLEVELAND AND KENT, OHIO · BIRMINGHAM · CHICAGO

These save

Dempster-Dumpster serving a 6 cu. yd. container with cooling fins for handling a high temperature product.

Here are a few of the hundreds of Detachable Containers we have built to solve handling problems of every description. A few others not shown include those with compartments . . . with insert containers . . . fully-insulated . . . lined with lead . . . lined with fire brick . . . with windows and doors . . . with casters . . . flat bottoms and open at one end . . . with teeth . . . with shelves for tools and supplies—and we could describe hundreds more, all served by one Dempster-Dumpster and only one man, the driver.

This 3 cu. yd. Container has skids for fork lift truck transfer.

10 cu. yd. Container widely used for refuse and combustible wastes.

Flanged wheel equipped containers for remote loading.

5176

DEMPSTER

4 manufacturers to $82,000.00 annually handling waste materials!

These four industrial plants expect to save, in labor costs alone, during the first five years service of the Dempster-Dumpster System—

A PLASTICS PLANT: $26,958.00 savings on an investment of $9,523.50 in Dempster-Dumpster equipment. Savings alone pay for equipment in two years.

A CHEMICAL PLANT: $204,076.75 savings on an investment of $40,968.00 in this equipment . . . savings pay for equipment in one year.

AN AUTOMOTIVE PLANT: $135,000.00 savings on an investment of $19,272.00 . . . savings pay for equipment in 9 months.

A PAPER AND PULP MILL: $43,104.00 savings on an investment of $10,750.00 . . . savings pay for equipment in 1¼ years.

Those are typical examples. Visualize a Dempster-Dumpster, operated by only one man, the driver, serving scores of big steel containers, one after another, in your plant. Containers of many designs and types, handling waste or salvable materials, raw or finished products, fluids including acids, combustibles, dusty materials—anything that can be handled in up to 21 cu. yd. detachable Dempster-Dumpster Containers . . . payloads up to 19 tons. Savings are tremendous! Take advantage of our free engineering service, which determines by fact-finding survey the cost cutting possibilities of this system in your plant. Dempster Brothers, Inc.

600 Gal. stainclad tank with brine cooling channels.

A Container available up to 10 cu. yds. with or without lids for many uses.

A 9 cu. yd. container for handling packaged products.

BROTHERS **676 Dempster Bldg., Knoxville 17, Tenn.**

B&W HOLLOW FORGINGS ARE SUPPLIED IN THE FOLLOWING STANDARD MATERIALS

CARBON STEELS

ASTM A 106 Grade A
ASTM A 106 Grade B
ASTM A 106 Grade C

Analyses such as SAE or AISI carbon steel will be considered if quantities are sufficient.

INTERMEDIATE CROLOYS
ASTM SPEC. A 335

Carbon Moly	P 1
Carbon Moly High Silicon	P 15
Croloy ½	P 2
Croloy 1	P 12
Croloy 1¼	P 11
Croloy 1¾	P 3
Croloy 2	P 3b
Croloy 2¼	P 22
Croloy 3M	P 21
Croloy 5	P 5
Croloy 5 Si	P 5b
Croloy 7	P7
Croloy 9-M	P 9

ASTM Spec. A 335 has superseded and replaced ASTM Specs. A 158, A 206, A 280 and A 315.

This list includes all grades of A 335 except grade P 5c, which we do not make.

B&W Croloys, 2½, 3, 5M, 7M, and 9, are not included in A 335. We will supply these additional alloys in accordance with A 335, except for chemistry, upon request.

STAINLESS STEELS
ASTM SPEC. A 312

Croloy 18-8	TP 304
Croloy 18-8 Ti	TP 321
Croloy 18-8 Cb-Ta	TP 347 (Cb-Ta)
Croloy 18-8 Cb	TP 347 (Cb)
Croloy 16-13-3	TP 316

These grades will also be made to ASTM specification A 376 excluding "special inspection" requirements.

Other grades of Stainless Steel listed under A 312 are TP 309, TP 310, TP 317. These grades are presently not offered as standard, but will be considered on request.

Sold in just one year!

Miles of B&W Hollow Forgings

. . . in a range of analyses with sizes up to 35" O.D.

Many miles of B&W Hollow Forgings, of all sizes and analyses, were sold for use in the power, petroleum and chemical industries in 1955. Excellent manufacturing facilities, plus B&W's ability to accept orders for both large and small quantities for definite deliveries, are some of the factors that have resulted in this widespread preference for B&W Hollow Forgings.

For the complete B&W Hollow Forgings story, send for new Bulletin S-16B. The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.

BABCOCK & WILCOX

BOILER DIVISION

S-454-A

Engineering in Action

...BACKED UP *three deep*

with parts and service—when you use

Allis-Chalmers FORK TRUCKS

Strategically located FACTORY

You enjoy almost "Factory-town" service wherever you are when you operate Allis-Chalmers Fork Trucks — for you are backed up *three deep* by Allis-Chalmers' highly successful dealer-branch-factory system.

What does this mean? It means that your dealer is serviced directly from a nearby factory branch — *one of 14.* Each branch carries a full stock of True Original Parts and is staffed with factory-trained servicemen as well as sales engineers. This assures prompt attention whether you need a replacement part or technical advice.

Ask your Allis-Chalmers material handling dealer to show you how Engineering in Action with this *three-deep* service can help on *your* specific job. Write for literature and details.

MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

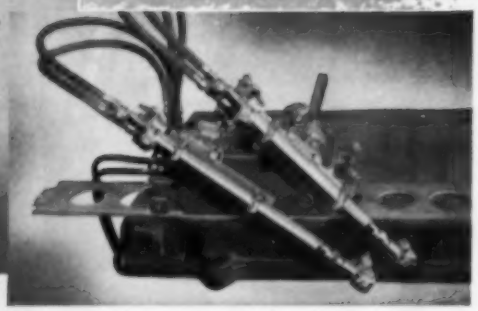
Your nearby DEALER

ALLIS-CHALMERS

NOW, speeds from 0 to 180" per minute with new

VICTOR
PORTABLE
Flame-cutting Machine
MODEL VU-120

Model VU-120 weighs only 35 lbs. Main wheels run on ball bearings; casters swivel on ball bearings, run on oilite bearings, are shrouded as protection against slag.



Torches on Model VU-120 easily angled for bevel cuts. Machine accommodates both 2 or 3-hose torches, and in certain set-ups each holder can handle multiple torches.

Operates at same speeds forward or reverse.
Cuts straight lines, circles, square or bevel kerfs.
Adaptable to many automatic welding applications.

Now constant running motor and 3-position torque-converter transmission of new Model VU-120 bring you speeds from 0 to 180" per minute—forward and reverse—without loss of power at low speeds. In neutral position, machine free wheels so you can set up easily and quickly. Wide speed range enables you to adapt travel carriage to many automatic welding applications, using either submerged or inert arc.

You get remarkable accuracy from the Model VU-120. Floating rear caster practically eliminates side tilt and wobble. There's no "creeping"—shut off machine and it stops instantly.

Universal torch holder accommodates any model VICTOR machine cutting torch, with or without gear rack. Two torch holders can be used if desired. Case is pre-drilled for extra torch holder, side guide roller, or counterweight.

Try the fast-operating VU-120. Ask your VICTOR dealer for a demonstration on your job NOW . . . or write us for descriptive Bulletin 353.

VICTOR for welding

For maximum efficiency and safety, use genuine Victor tips and parts

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

31

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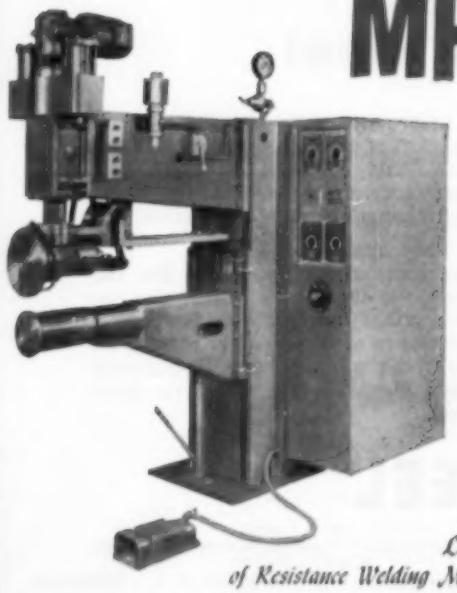
FOR THE FIRST TIME A COMPLETELY NEW DESIGN OF SMALL, LOW PRICE SCIAKY SEAM WELDERS

Featuring all the Ruggedness, Dependability and Consistency of Operation Common to Sciaky Basic Thinking—Welders Designed to Do More Useful Work at Lower Operating Cost with Maximum Reliability!

MP-2 AIR OPERATED, PRESS TYPE, LOW IMPEDANCE SINGLE PHASE SEAM WELDER



Through advanced design, volume production tooling and complete use of integrated parts, Sciaky has been able to add a seam welder to its line of competitively priced, small, standard welders. Check these important design features . . .

Pneumatic Double-Acting Cylinder Head
Low Inertia, Anti-Friction Bearing Guided Ram
Side Mounted Sciaky Integral Control
Low Impedance Secondary Circuit
Sciaky High Efficiency Welding Transformer
Copper Alloy, Fully Adjustable Lower Arm
Silver Plated, Laminated Flexible Shunt Conductor
Simple, Positive Internal Gear Drive

For complete details and specifications on the MP-2 seam welder write for Bulletin 321-7.

Largest Manufacturers of Resistance Welding Machines in the World

SCIAKY

SCIAKY BROS., INC. • 4909 W. 67th STREET • CHICAGO 38, ILLINOIS

3 kinds of help on sheet and strip steel

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

RYERSON STEEL

PRINCIPAL PRODUCTS: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Metalworking Outlook

Enough Steel for '56 Autos

Auto assemblers have enough steel on hand to complete the 1956 model run and to get a slight start on 1957s. If sales of the new models go as well or better than expected, the auto companies will jump into the steel market with an especially large splash this fall. That will come at a time when the steel industry (which should have settled the strike by then) will be struggling to make up losses brought by the work stoppage. Significance: The really serious effects of the steel strike aren't going to be felt during the walkout; they'll come after the dispute is settled.

Defense Steel: No Problem

Most third quarter defense steel needs probably can be met by unstruck mills (for a list of ingot producers that were still operating last week, see page 82). Business & Defense Services Administration believes that about 600,000 tons will do the job for July, August and September. To accomplish the task, BDSA has boosted the setasides substantially on many products made by the plants still rolling. Last week, they produced 307,000 tons of steel ingots.

Europe's Stocks Tight, Too

Don't expect much help from abroad on steel supplies. A steel strike threatens in Great Britain, and plants are working at or near capacity in other West European nations. Steel stocks in West Germany average 80 days, 10 to 20 days more than a year ago, but consumers are hedging against a price rise. Steel production in that country will be some 10 per cent higher this year than last. Gains of that order will be common throughout West Europe.

Business: Steady, but Level

Chicago purchasing agents report business is on a high, but decidedly level plateau. Delivery performance remains good; prices are level; the trend toward smaller and more controlled inventories which started in March continues; backlogs remain steady; the emphasis is on shorter lead time for buying, with nearly half showing a 30 to 60-day purchasing policy.

Profits Dip Slightly

After-tax profits are slipping, following a high point in 1955's fourth quarter. A Securities & Exchange Commission report shows that manufacturers' profits after taxes per dollar of sales dipped to 5.4 cents in this year's first quarter, from a high of 5.6 cents in the previous three months. Sales sagged from $73.6 billion in the 1955 period to $71.9 billion in the first quarter this year. Purchasing Agents Association of Chicago says

the trend among its members is steadily downward in net profits for the last five months.

AEC Seeks Private Supplier

Atomic Energy Commission is looking for a private source to process enriched uranium. A three-day classified meeting will be held starting Sept. 13 to supply industry with information on processing enriched uranium hexafluoride to uranium metal, uranium dioxide and uranyl sulphate. Also to be discussed will be the recovery of uranium scrap. AEC now does all this job itself.

Hopes Dim for Tax Cuts

There's little chance of any general tax reduction bill passing Congress this year. The pressures of time and the slimness of any budget surplus are against such a move. But it will be a hot topic next year.

Co-op Research on the Rise

Co-operative research is on the increase, according to a report prepared for the National Science Foundation by Battelle Memorial Institute. In 1953, 543 co-operative groups spent $21 million for research and development. Except for a small amount spent for social science research, practically all of it went for technical problems. That was divided into about 70 per cent for applied research and 30 per cent for basic, mainly in the chemical and engineering sciences. Expenditures by individual organizations ranged from less than $100 to nearly $1.7 million. Trade associations accounted for 60 per cent of the expenditures, agricultural co-ops for 15 per cent, professional and technical societies for 10 per cent, research-education co-ops for 5 per cent and other miscellaneous groups for 10 per cent.

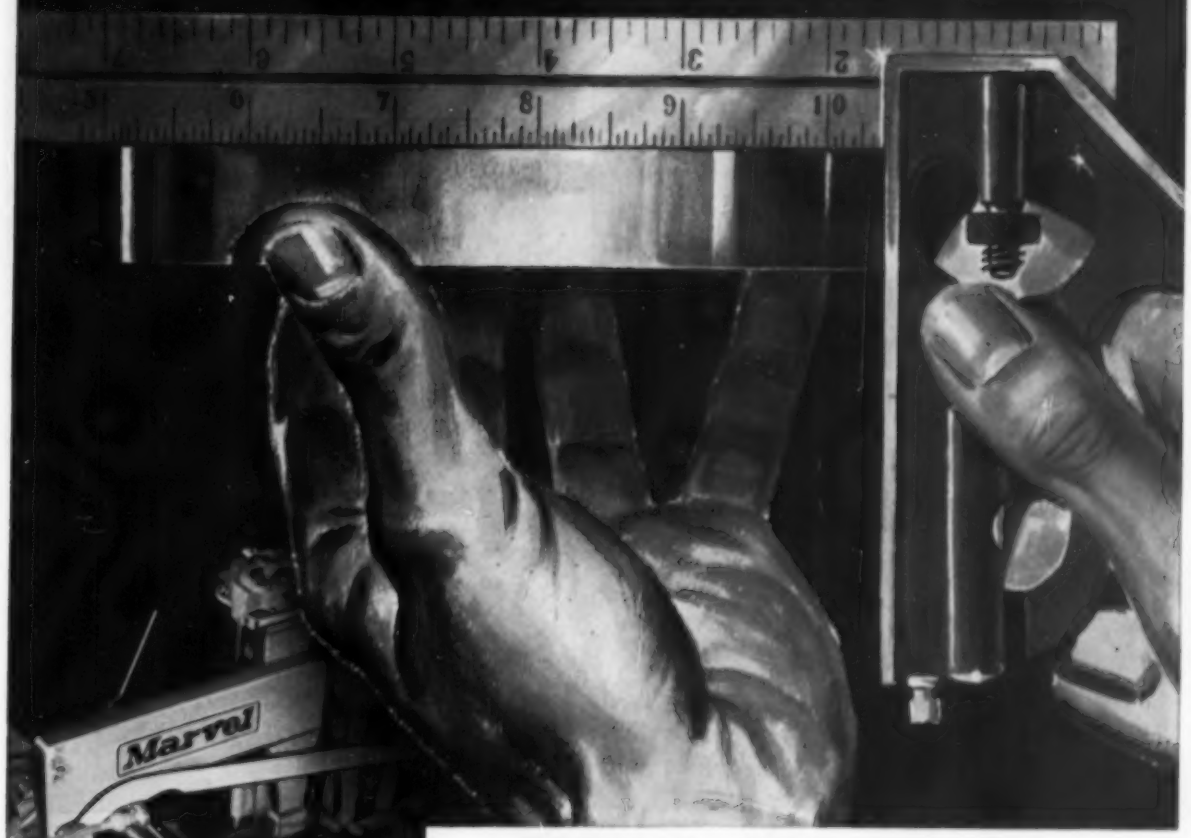
Birthday in Air Conditioning

America's air conditioning industry is 54 years old tomorrow. On July 17, 1902, Dr. Willis H. Carrier completed drawings for the world's first scientific air conditioning system. It controlled temperature and humidity in a Brooklyn color lithography plant. Only a half-century later, the industry will ring up total retail sales of $3.2 billion, in 1956. Almost 30 years ago, in 1927, Carrier Corp. developed the first air conditioner specifically designed for homes. In 1956, 200,000 central home air conditioners will be installed. Carrier estimates that figure will mount to more than 500,000 by 1960 and hit nearly 1.2 million by 1965.

Straws in the Wind

Watch for extension of the GI housing program . . . Mesta Machine Co., Pittsburgh, will build machinery to increase output of Kaiser Steel Corp.'s 86-in. hot strip mill at Fontana, Calif. . . . Aluminum Co. of America is marketing a forged disc aluminum wheel for tubeless truck tires.

IN CUTTING-OFF OPERATIONS...



...SPEED WITHOUT ACCURACY IS COSTLY!

Efficient cut-off of steel blanks from bars demands a combination of speed *and accuracy*. MARVEL, and MARVEL alone, achieves this combination with machines capable of delivering feeds and speeds which fully utilize the strength and heat resistance of the modern high speed hack saw blade.

MARVEL dual power feed and crank lever method of reciprocation are two exclusive features designed to give increased speed and efficiency. This unique dual power feed employed on the Series No. 6 and No. 9 MARVEL Ball Bearing Hack Saw Machines, simultaneously controls both positive feed depth and feed pressure, automatically adjusting both pressure and depth of feed correctly in proportion to the number of teeth in contact with the work. This automatically forces the blade to cut as deeply as possible and practical on every stroke, without demanding the attention of the operator. As a result, the work is cut-off in the fewest possible number of strokes. Quick return of the saw frame on the non-cutting stroke, accomplished by the crank lever, delivers 33⅓% *more* cutting strokes per minute without increasing the blade velocity on the cutting stroke.

Accuracy is assured by the construction of the machine itself. Anti-friction ball or roller bearings are used at all load carrying points. The saw frame reciprocates on fully enclosed special design ball bearings which are factory adjusted with a pre-load, assuring permanent frictionless rigidity. Saw frame, saddle, and upright are precision machined and fitted to form a rigid integral unit capable of withstanding any cutting load with no deflection or side movement.

These exclusive features found only in MARVEL Hack Saw Machines, together with the unequalled performance of the unbreakable MARVEL High-Speed-Edge Hack Saw Blade, form a team that guarantees the fastest, most accurate cutting-off.

There is a MARVEL field engineer near you capable of intelligently discussing your cut-off work. Send for catalog C-55, and the name and address of your nearest MARVEL field engineer.

S-1300

ARMSTRONG-BLUM MFG. CO.
5700 WEST BLOOMINGDALE AVE. • CHICAGO 39, ILL.

Metal Cutting **MARVEL SAWS**
Better Machines–Better Blades

No dezincification after Ni-Vee bronze parts replaced manganese bronze stems in water system valves such as these produced by water works equipment manufacturer, Rich Mfg. Co., Los Angeles, Calif.

How Ni-Vee bronze valve stems halt failures in water system

VALVE STEM BREAKAGE puzzled and plagued water system engineers in the City of Los Angeles.

Cause of the trouble? Dezincification. A form of corrosion that sapped strength from manganese bronze stems in cast iron valve bodies.

Finally city engineers found the answer. As a result of 5-year tests of copper-base alloys in a variety of waters, these engineers turned to valve parts cast in Ni-Vee* nickel-tin bronze.

High mechanicals

Containing less than 2% zinc, mainly for scavenging in the melt, Ni-Vee bronze stays immune to dezincification. Thus, it retains its original strength indefinitely. But that's only part of the story.

Ni-Vee bronze gives you high "as cast" tensile strength which simple heat treatment can lift up to 90,000 psi. In addition, this bronze resists wear, impact and galling. It offers easy castability, low shrinkage, pressure tightness, fine grain. Versatility plus economy.

Avail yourself of the money-saving advantages afforded by this simple family of five outstanding Ni-Vee bronzes. Use them anywhere copper-base cast alloys have application for pressure, constructional and bearing needs. And write for your copy of *"Engineering properties and applications of NI-VEE BRONZES."* Do it now. *Registered trademark

INCO NICKEL ALLOYS **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.

Labor: New Fixed Cost

The current negotiations between the steel industry and the United Steelworkers of America bring home forcibly the fact that labor is a cost for industry that no longer can be turned on and off with the flow of incoming orders. It's a cost that's becoming more and more fixed, that goes on whether or not employees are engaged in productive work.

Forty years ago anything less than a 10-hour day and a 6-day week for hourly workers was regarded as impractical. Layoffs could be made at will. Fringe benefits except for some white collar workers were relatively unknown.

But the social legislation of the depressed thirties and the rising power of the labor unions brought forth benefits such as social security and allowances for work clothing. More fringes came with the wartime necessity of getting and holding workers.

Fringes gained during the emergency have been expanding and moving into new areas at an accelerated rate. They include paid holidays, paid lunch hours, sick leave, subsidized lunches, rest periods, bargaining and grievance time, time off for funerals, group insurance and pension programs.

This year labor is asking for a seventh paid holiday, improved insurance and pension plans and liberalized vacations. Supplemental unemployment benefits (See How to Live With SUB, STEEL, July 16, p. 121), already applying to 2 million workers, will encompass another 1.2 million in the steelworkers' union. The shorter workweek, while not a direct fringe benefit, is getting increasing attention.

Today, the fringe benefit package for American industry averages 40 cents an hour. With the labor unions pretty much controlling the pattern of future negotiations you can rest assured that the package will grow fatter and more permanent.

For an organization to stay alive under the free enterprise system it means: That management must really know its costs and use every means at its disposal to raise the level of productivity; that labor must eliminate make-work clauses, seniority provisions, resistance to technological improvements and other factors that interfere with efficient production.

The little fringes of a decade or two ago have become a big fixed cost item that cannot be shrugged off.

Irwin H. Such
EDITOR-IN-CHIEF

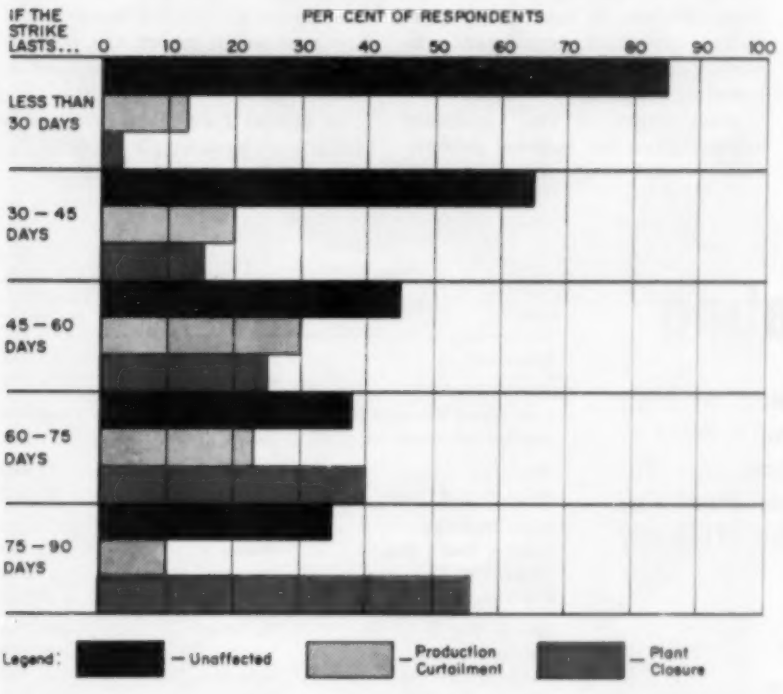
WHEN AUTOS CAME IN ONE COLOR

Hard to believe, isn't it, that the "last word" in the autos of our youth are now museum pieces. The automotive industry has drastically changed our mode of living and today is meeting the challenge of an apparently insatiable public demand for higher standards of design, power and comfort in personal transportation. Many of the advances in car design and performance have been made possible by improved steels. Working with automotive manufacturers to provide the *right* steels has been one of the important jobs at Inland for many years.

INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the automotive industry include hot and cold rolled sheets and strip, bars, plates, structurals, 4-Way safety plate. Other products: tin mill products, Ti-Co galvanized sheets, reinforcing bars, rails and track accessories, coal chemicals.*

INLAND

Strike's Impact on Steel Users


IF THE STRIKE LASTS...
PER CENT OF RESPONDENTS
0 10 20 30 40 50 60 70 80 90 100
LESS THAN 30 DAYS
30 – 45 DAYS
45 – 60 DAYS
60 – 75 DAYS
75 – 90 DAYS
Legend:
– Unaffected
– Production Curtailment
– Plant Closure

Trouble To Come in 30 Days

With the steel strike 15 days old, a STEEL survey shows that most of metalworking won't feel the pinch for another month. After that the effects will snowball

THE CRITICAL area in the strike barometer will be the 30 to 60-day period. If the strike lasts less than 30 days, only 15 per cent of the respondents to a STEEL survey will be affected.

The percentage affected will jump another 20 points if the strike goes 30-45 days, and another 20 if it runs 45-60 days (see chart).

Danger Point—After a 60-day strike it could run to 90 days and affect only an additional 10 per cent of STEEL's respondents.

Comments a Utica, N. Y., metalworking executive: "We expect our slowdown in 30 to 45 days because we normally operate that far behind steel deliveries." With metal users carrying a 30-60 days' supply of critical items like sheet, plate and structurals, the rush to rebuild stocks once the strike ends will keep many items on the critical list for months to come.

Critical List—"Special sizes in plates are now giving us trouble. There seem to be none available," says an eastern tool and die maker. Production will be cut after Aug. 1.

From Utah: "Fabricators in this area are all in poor shape on inventory." That iron works executive thinks he will close down if the strike goes over 30 days. He has started cutting production.

A West Virginia firm which is dependent on cold-rolled sheets and flat enameling iron will shut down before the strike is 45 days old.

Snowballing—Last week the nation's economy stood a loss of about $270 million: $220 million in lost steel sales and $50 million in wages lost by the 500,000 striking steelworkers.

The situation will snowball if the strike goes past the 30-day mark. The economy's loss will rise rapidly to a $700-million per week rate by the 60-day mark, as more dependent industries curtail production or shut down completely.

Fanning Out — Some 50,000 miners in the captive coal mines may be affected by the strike. Another 100,000 are laid off in steel-related industries, particularly in transportation.

The country's biggest rail carrier, the Pennsylvania Railroad, is laying off 18,000 workers because of the strike. "Each department has been instructed to reduce forces as far as possible without detriment to service or safety," reports James M. Symes, president.

The steel industry normally accounts for 30 per cent of the railroad's business.

Ingalls Shipbuilding Corp. has closed its Decatur, Ala., shipyard to conserve steel for its operations at Pascagoula, Miss. However, 800 workers have also been laid off at Pascagoula. An example of a severe shortage caused by the steel strike: Not enough cotton bale ties to handle the South's current crop. The major producer, U. S. Steel Corp.'s Tennessee Coal & Iron Division, has been down since Apr. 28.

Expansion Stops—In the Cleveland area about 1500 construction workers have been shifted from steel plant expansion projects to other jobs.

Last week construction workers at Republic Steel Corp. were asked by the steelworkers to "respect our picket line." Projects of Jones & Laughlin Steel Corp. and U. S. Steel Corp.'s American Steel & Wire Division are stopped.

The maintenance situation is also tight. Fewer maintenance men are being passed through the

picket lines than in former strikes.

Vacations — Some refractory makers are granting vacations, as are other directly concerned industries. Hotpoint Co., Chicago, has a six weeks' supply of steel and reports the company will close down for a plant vacation during the last week of July and the first week of August. If the strike is still on when Hotpoint reopens, there will be some production curtailment.

Some firms can't curtail production gradually; they must shut down completely, like Pullman Standard Car Mfg. Co., Chicago. The firm will continue normal production for 30 days; then shut down because it can't store partially completed equipment to work only on items for which it has steel available.

West Coast — The California story follows the national pattern. Nearly 7000 steelworkers are out in the Los Angeles area; other industries will probably not be touched for another month.

Aircraft industry sources say operations won't have to be curtailed unless the strike lasts several months. District auto industry spokesmen report the current rate of production can continue for two months.

A lighter note: San Francisco's cable cars have ample cable in reserve to last out the strike.

Who's Operating

Last week, 64 companies listed as ingot producers by the American Iron & Steel Institute were still pouring. Producers that don't make ingots, like Acme Steel Co., Chicago, are not included in this STEEL rundown.

NAME	PLANT LOCATION	ANNUAL INGOT CAPACITY (net tons)
Alan Wood Steel Co.	Ivy Rock, Pa.	625,000
Alco Products Inc.	Latrobe, Pa.	105,160
American Compressed Steel Corp.	Cincinnati	21,600
Armco Steel Corp.	Butler, Pa. and Middletown, O.	2,196,000
Baldwin-Lima-Hamilton Corp.	Burnham, Pa.	169,960
Barium Steel Corp.	Phoenixville and Harrisburg, Pa.	898,600
Louis Berkman Co. Ohio River Steel Div.	Steubenville, O.	136,080
Borg-Warner Corp.	New Castle, Ind.	64,000
Braeburn Alloy Steel Corp.	Braeburn, Pa.	20,730
A. M. Byers Co.	Pittsburgh	90,000
Cameron Iron Works Inc.	Houston	58,800
Carpenter Steel Co.	Reading, Pa.	73,700
Columbia Tool Steel Co.	Chicago Heights, Ill.	6,600
Continental Steel Corp.	Kokomo, Ind.	394,000
Copperweld Steel Co.	Pittsburgh	618,380
Detroit Steel Corp.	Detroit	1,290,000
Eastern Stainless Steel Corp.	Baltimore	50,000
Edgewater Steel Co.	Pittsburgh	117,600
Empire Steel Corp.	Mansfield, O.	500,000
Erie Forge & Steel Corp.	Erie, Pa.	234,000
A. Finkl & Sons	Chicago	33,600
Firth Sterling Inc.	Pittsburgh	20,040
Ford Motor Co.	Detroit	1,877,420
Granite City Steel Co.	Granite City, Ill.	1,080,000
Green River Steel Corp.	Owensboro, Ky.	179,400
Harrisburg Steel Corp.	Harrisburg, Pa.	100,750
Heppenstall Co.	Pittsburgh	55,550
Hoster Steel Corp.	Oklahoma City, Okla	12,000
International Harvester Co.	Chicago	1,000,000
Isaacson Iron Works Inc.	Seattle	102,000
Jessop Steel Co.	Washington, Pa.	33,490
Joslyn Mfg. & Supply Co.	Chicago	37,500
Kaiser Steel Corp.	Fontana, Calif.	1,536,000
Keystone Steel & Wire Co.	Peoria, Ill.	425,000
*Kilby Steel Co.	Anniston, Ala.	34,020
Knoxville Iron Co.	Knoxville, Tenn.	38,000
Laclede Steel Co.	St. Louis	500,000
Latrobe Steel Co.	Latrobe, Pa.	24,000
*R. G. Le Tourneau Inc.	Longview, Tex.	83,100
Lone Star Steel Co.	Dallas	550,000
McLouth Steel Corp.	Detroit	1,380,000
Merritt-Chapman & Scott Corp.	Milton, Pa., and Newport, Ky.	798,500
Mesta Machine Co.	Pittsburgh	105,000
Midvale-Heppenstall Co.	Pittsburgh	325,000
National Forge & Ordnance Co.	Irvine, Pa.	25,000
National Steel Corp. Weirton Steel Co. Div.	Weirton, W. Va.	2,800,000
National Supply Co.	Torrance, Calif.	50,200
Newport News Shipbuilding & Drydock Co.	Newport News, Va.	12,000
Northeastern Steel Corp.	Bridgeport, Conn.	303,200
Northwest Steel Rolling Mills Inc.	Seattle	46,000
Oregon Steel Mills	Portland, Oreg.	120,000
Pacific States Steel Corp.	Niles, Calif.	181,770
H. K. Porter Company Inc.	Birmingham, Philadelphia and West Aliquippa, Pa.	149,600
Rotary Electric Steel Co.	Detroit	300,000
Simonds Saw & Steel Co.	Fitchburgh, Mass.	21,600
Southern Electric Steel Co.	Birmingham	30,000
Southwest Steel Rolling Mills	Los Angeles	45,000
Texas Steel Co.	Fort Worth, Tex.	70,450
Timken Roller Bearing Co.	Canton, O.	700,000
Union Electric Steel Corp.	Pittsburgh	26,760
Universal-Cyclops Steel Corp.	Bridgeville, Pa.	70,160
Vanadium-Alloy Steel Co.	Latrobe, Pa., and Monaca, Pa.	42,000
Washburn Wire Co.	Phillipsdale, R. I.	93,000
West Virginia Steel & Mfg. Co.	Huntington, W. Va.	78,840

*Facilities not in full operation

Though U.S. has tied up many warehouse steels . . .

Few Users Will Be Hurt

THOUGH it's still too early to gage the full effects of the warehouse steel freeze ordered by the government on July 6, most commercial customers should go unhurt.

Reasons: 1. The freeze may not last long enough to interrupt normal operations. 2. Exemptions were written in to permit most customers at least to keep their plants running. 3. As far as heavy carbon plate is concerned, supplies were already so tight that further limits are of almost academic interest.

Short-Lived?—The move was inspired primarily by Atomic Energy Commission and the Defense department. These agencies were concerned about supplies of rated steel for their various crash programs in the event of a long steel strike. When the lid was clamped down, Business & Defense Services Administration spokesmen said that ten days to two weeks should give them time to fill their orders.

Comments one warehouseman concerning the supposed time limit: "I've worked with controls a long time. I'll believe it when I see it."

Classes — Aircraft steel in all forms and shapes comes first on the restricted list. Since relatively few commercial uses exist for this material, few commercial users can be hurt.

The lines are not so well-drawn in nickel-bearing stainless and nonstainless alloy steels. It's uncertain how much of these ordinarily are bought for defense use, how much for commercial use. The American Steel Warehouse Association, Cleveland, however, believes that commercial uses may outweigh military.

Exemptions—In these classes of warehouse steel, exempted from the freeze are all semifinished products, also raw steel. But warehouses carry little semifinished, so this won't help much. More realistic: BDSA is permitting shipments of "under 500 lb for each form or shape of nickel bearing stainless; shipments of under 2000 lb for each form or shape of alloy steel and carbon plate."

The weight exemptions are designed to protect small business and assure the availability of steel products for necessary maintenance and repair work.

Proof of Pudding — What happens next? Some commercial users are worried that they may find warehouse stocks raided after the lid lifts. The will to raid may well be there. One aircraft company is reported to have placed blanket orders for 15 tons of carbon plate in each size from 3/16-in. to 4½-in. with West Coast warehouses. If these orders were filled, local plate stocks would be stripped.

But BDSA's directive contains no compulsion for warehouses to meet such demands. American Steel Warehouse Association believes that at least in alloy steels, stocks are sufficient to meet demands of both defense and commercial users for the time being. It looks as though the order will do what it was designed to do—protect crash programs while minimizing hurt to commercial users. If Washington follows its self-imposed schedule, we should know by the end of this week.

Sewerage Construction Up

Local governments awarded construction contracts for 169 projects to clean up polluted streams during the first quarter of 1956.

The Public Health Service of the Welfare department says the number of contracts was about the same as the previous quarter and the first quarter of last year. However, a $78-million project for Allegheny county, Pa., brought the total of $129 million to about twice that of any quarter last year.

Idle boats in Cleveland illustrate the expanding effects of the strike

Ore Vessels Tie Up

Mesabi mining ceased with steel strike, choking off supplies. Ore in freight cars and on docks was shipped down the lakes quickly. Cargoes fell 60 per cent in a week

WITHIN a week after the start of the steel strike about 50 per cent of the ore boats were idle. The only ore now being moved is from Steep Rock and Michipicoten in Canada.

Big Holdup—Ore in transit continued to move, but unloading operations were slowed down. Ships had to wait their turn to unload at docks not closed by the strike. Other delays were caused by the type of ore in holds and its destination.

Around 30 of the idle boats halted at Cleveland. Donald C. Potts, president of the Pittsburgh Steamship Division, U. S. Steel Corp., had about 20 boats in his fleet lay up at Milwaukee and an equal number at Duluth-Superior. Other ships are at smaller ports.

More than 30 vessels were expected to dock in the bay at Muskegon, Mich. Some fleets took advantage of the strike to put ships in drydock—Pickands Mather & Co. sent five.

Companies are retaining licensed seamen. Some of those not licensed have been laid off, but no trouble is expected in getting started after the strike is over.

The Effect—The fleet has been bringing down ore at about the rate of 12 million gross tons a month. Furnaces have been using about 7 million tons a month.

If the strike lasts a month, there will be 5 million tons of ore less to carry over to the winter months. A long strike and an early end of the ore shipping season (or a late beginning next spring) could cause trouble.

Stocks of U. S. Lake Superior ores were less than 19 million tons at the end of April. By May 31, they had been built up to 23,442,444 tons.

When the steel strike started, shipments were about 3 million tons ahead of 1955's.

Continuous Casting By-passed

Inland Steel Co. has ordered a new universal slabbing mill from United Engineering & Foundry Co. A part of the $260-million expansion program announced eight months ago, the decision to order the mill had been deferred while Inland looked into continuous casting.

Reports Hjalmar W. Johnson, vice president of steel manufacturing: "During the test program a great deal of knowledge and data were accumulated on the process of continuous casting of carbon steels and on the product produced." However, Inland will not use the method at this time, because it could not be integrated with existing facilities by the time the rest of the expansion program is completed.

Armco Adds Sintering

Dravo Corp., Pittsburgh, will build an iron ore sintering plant for Armco Steel Corp.'s Ashland, Ky., works.

Increased pig iron production and more effective use of ore fines and blast furnace flue dust are expected.

Capacity of the sintering machine will be 2400 tons a day. The plant is expected to be completed late in 1957.

Second Half U.S. Car Output: 2.6 Million

(In thousands)

	*1956	1955	1954
July	390	660	441
August	280	614	436
September	320	462	286
Third Quarter	990	1,736	1,163
October	560	518	237
November	610	749	508
December	480	682	642
Fourth Quarter	1,650	1,949	1,387
Second Half	2,640	3,685	2,550
First Half	3,209	4,257	2,959
Total	5,849	7,942	5,509

*1956 estimated by STEEL

Other figures: Ward's Automotive Reports, totals adjusted

Auto Sales: Realism Returns

AUTO MAKERS expect to build 2.6 million cars in the second half. Sales may be closer to 2.7 million, since dealers will be slimming down backlogs — currently about 740,000.

George Romney, president, American Motors Corp., Detroit, makes that prediction. He adds: "Final sales and production figures for the year should both be in the area of 5.9 million." That's 25 per cent lower than last year.

Agreement—Harlow Curtice of General Motors Corp. and Henry Ford II go along with Mr. Romney. Mr. Curtice's latest estimate of domestic sales is 5.8 million, Mr. Ford's, "less than 6 million."

The biggest chunk of second half production will be '57 cars. It's figured that 1.6 to 1.7 million new models will be built in the last quarter. Most of them will make their debut in October, although two in the high priced field may make late September bows.

Top Three—So far, industry output is off about 26 per cent from last year's. Saleswise, though, Lincoln, Cadillac and Mr. Romney's Rambler are holding their own. Lincoln leads, with sales running 27 per cent ahead of last year's.

Cadillac sales are estimated down only 0.87 per cent from last year's at the halfway mark. It's thought that new model introduction will shove fourth-quarter Caddy sales 5 to 7 per cent higher than they were in 1955.

American Motors pegs first half Rambler sales at 39,752 units, 3.6 per cent under the 41,296 sold over the same period a year ago. The Rambler will be divorced from the Nash and Hudson name tags starting with the new models. Sales for this year are expected to equal or exceed last year's.

Dealers for other makes and models are becoming more optimistic. They hope to sell at least 1.2 million 1957 models, possibly more, before year end.

Price Problems?—Few dealers appear to be worried that price hikes on the new models will hurt sales. Carl E. Fribley, president, National Automobile Dealers' Association, disagrees vehemently: "The last price increase in 1956 was absorbed entirely by dealers. They can't absorb any more."

Next year is still in doubt. Industrial economists are chary after this year's misguided optimism. A poll of dealers, part suppliers and some intrepid market analysts indicate that a production goal of over 7 million is a fair target for 1957.

Present—Meanwhile, most of the industry is waiting for that fourth-quarter pickup. Heavy duty trucks (19,500 lb and over) are already booming.

John N. Bauman, president, White Motor Co., Cleveland, says: "We will continue at our regular production rate through the third quarter." White has been averaging about 260 units weekly this year. That's 25 per cent higher than output in 1955.

Estimates—Mr. Bauman adds: "I'd guess that fourth quarter output will be 15 per cent over that of the second quarter and 10 per cent higher than that in the fourth quarter last year. We expect to produce at least 16,000 units this year, maybe 17,000."

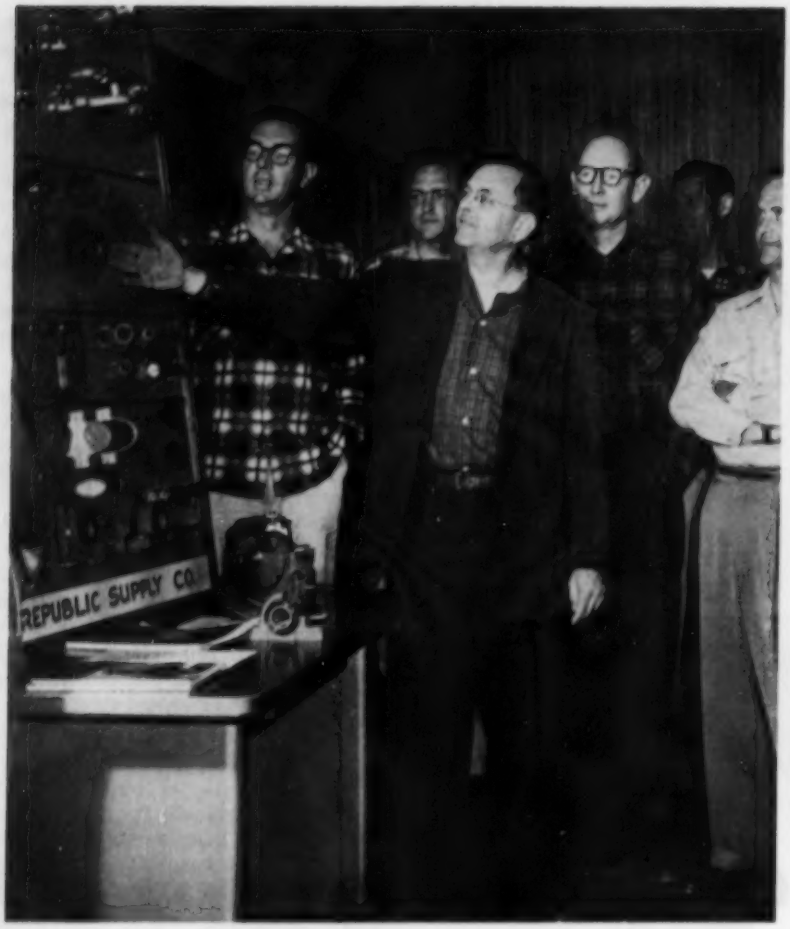
Lighter trucks aren't doing so well. They got off to a flying start, but bogged down in the second quarter. Total Chevrolet, Dodge, Ford and Studebaker truck output is 9 per cent above last year's at the end of the first half.

Suppliers—Some say that activity is picking up already. One fastener maker reports a few rush orders are coming in. Another says that Ford and Chrysler have told them to release July and August orders any time.

This holds true for most small parts, but other firms indicate orders won't lift until August. That's when carbuilders will start to close down for model change-overs.

Farm Outs — Several sources have it that auto makers can't make all the parts they had hoped to. It's understood that Ford's Sandusky, O., part plant can't meet original production schedules. It's asking for bids from vendors.

Partmakers think 1957 orders will run 10 per cent above this year's.



Boston Gear Works tailors its training programs to . . .

Help Distributors To Sell

SALESMEN for industrial mill supply houses often have more than 200 different product lines competing for their attention. Many have no training in engineering.

If you can help them understand the application of your products better, they will respond by doing a better than average selling job for you, believes Boston Gear Works, Quincy, Mass.

Rifle — Boston's sales training program is tailored to the needs of the average distributor's salesman. The company's engineering staff has developed a set of simplified textbooks, explaining the fundamentals of its product line, mostly power transmission equipment. They form the base for field courses which are handled by the company's nine district managers and eight resident managers.

From 25 to 50 men attend the average training course. Classes are usually held at night, and last about an hour and a half. Fundamentals of design, selection and application of the various products are put across with the minimum of technical jabberwocky. Classroom work includes assignment of problems. Textbooks are tied in with the company's catalogs.

Task Force—The company backs up its simplified field courses with more advanced instruction at its home plant under Leslie I. Harding, director of training. Participants are usually men who have completed or are well along in the field program. They are selected by the company's district managers and by distributors.

These courses run one week, full time. Typical attendance might include 12 distributor sales engineers or salesmen and some of Boston Gear's own trainees.

Payoff—Since the program was started five years ago, some 4200 men have attended field courses, and another 800 have been through the intensive course. The company has over 100 distributors selling products from stock. Over 80 per cent participate in the programs.

Says John Kisil, a sales engineer for Mau-Sherwood Supply Co., Akron: "I just got back from one of the full-week courses. It helped me tremendously and—important for a salesman—completely sold me on the superiority of Boston's product line."

Two-Way Radio for Trucks

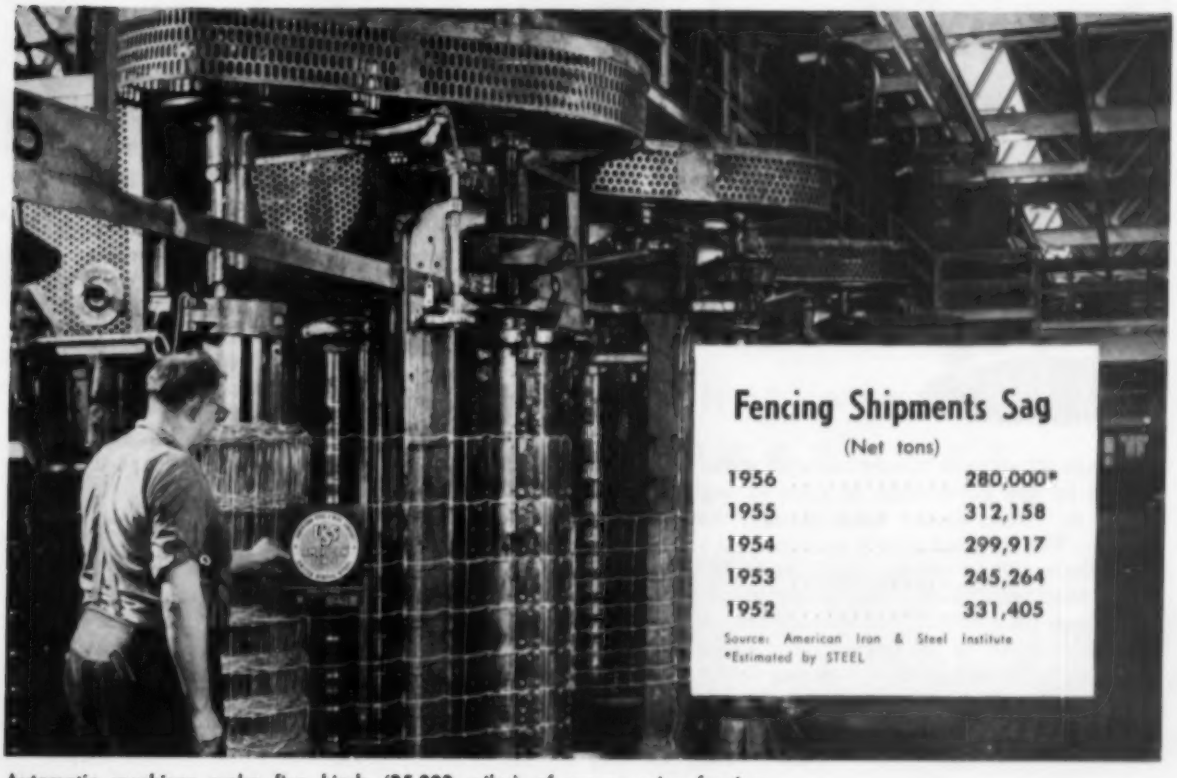
Widespread use of mobile radio units on trucks is expected to result from a contract between General Electric Co.'s Communication Equipment Section, Syracuse, N. Y., and Ryder System Inc., Jacksonville, Fla.

Under the agreement GE will lease two-way radio units for installation in trucks owned by Ryder Truck Rental Systems, a subsidiary of Ryder System.

Companies which rent the trucks will apply to the Federal Communications Commission for licenses to operate their own private communication networks.

Robert Anderson, vice president and general manager for Ryder Truck, says the system will help overcome traffic conditions. Instantaneous contact between the terminal and the driver, he says, will result in faster pickups and reduce deadhead mileage.

It is estimated that thousands of units will be used by companies such as laundries and beer distributors. Both GE and Ryder predict a multimillion dollar future for the plan.



Fencing Shipments Sag

(Net tons)

1956	280,000*
1955	312,158
1954	299,917
1953	245,264
1952	331,405

Source: American Iron & Steel Institute
*Estimated by STEEL

Automatic machines make five kinds (25,000 miles) of woven wire fencing yearly at Joliet plant of U. S. Steel's American Steel & Wire Division

Fencing Sales Drop

The slump in demand from farmers continues into its fifth year, but the upsurge in sales of chain link fencing for industrial and residential uses cheers makers

FENCING sales are off, but manufacturers are not discouraged. They analyze the situation this way: Farm demand is about as low as it can go. Ornamental fencing is moving well. Chain link fencing volume is high and going up.

What Happened—Fencing sales were high from the end of World War II on into 1952. They were down slightly in the recession year of 1949 but bounced back to an all-time high of 483,920 net tons in 1950.

In 1952, volume was 85,000 tons below 1951's; in 1953, it fell an equal amount to 245,264 tons, the postwar low.

Byron L. Smith, manager of market development, Continental Steel Corp., Kokomo, Ind., estimates the industry's 1956 sales of fencing at $48 million, a drop of about $8 million from 1955.

Farm Factors—More is behind the drop in farm sales than the hullabaloo over farm prices.

The trend to bigger farms has reduced fencing needs. Many boundary fences have been eliminated. Farming practices calling for bigger fields have also cut into sales.

Fencing makers were helped by the government's programs of the 1930s which encouraged grass and forage crops. The soil bank may have a similar effect.

Paul G. Strom, supervisor of agricultural extension for U. S. Steel Corp.'s American Steel & Wire Division, sums up the conflicting trends: "Sales of farm fencing will maintain their present level or increase."

Bright Side—Northwestern Steel & Wire Co., Sterling, Ill., says the building boom has been a plus factor in the demand for ornamental types. Continental Steel expects the industry's sales of ornamental and chain link fencing this year to surpass 1955's. Its fencing business is divided among farm (59 per cent), chain link (28 per cent) and ornamental (13 per cent).

Robertson Fence Co., Cincinnati, says high incomes have boosted residential demand for chain link fencing.

Roy E. Pinnegar, vice president and general manager, Cyclone Fence Department of American Steel & Wire, says chain link sales are up appreciably over last year's.

Chain-Link Fence Corp., Chicago, says its sales in the first half are up 7 per cent over the same period in 1955, which was its peak year. Home owners are buying 50 per cent of its tonnage, says Chain-Link. This compares with about 30 per cent five years ago.

Washington Concerned About Steel Strike's Political Effect

A hands-off attitude toward the steel strike will probably be maintained by the government in spite of urgings to "do something about it." That doesn't mean, though, that the strike will be ignored. The steel industry is so important to the nation's economy that there will be strong efforts made to bring management and labor together quickly. The longer the strike lasts, the stronger the pressures will be. Top concern centers around possible harm to the economy in an election year (since the administration is counting on a high level of business activity to support its Peace, Progress and Prosperity campaign this fall) and the availability of steel for defense needs.

Magnuson Wants Steel Investigation

Grist for the mills of legislators who favor an investigation of the steel industry is a statement by Sen. Warren G. Magnuson (Dem.-Wash.) reporting complaints by small business firms that they can't get enough plates and wide flange beams. The charges include a contention that captive fabricators and the large independent firms have no trouble getting the steel they need.

Coming: Congressional Check on Nickel

Watch for another congressional check into the nickel situation. Aim will be to find out why more isn't available for civilian use. Quick answer is that the military continues to chew up most of the available supply, so there's little chance of the probe turning up much additional nickel for the civilian market. That investigation will be in addition to a Commerce department nickel study called for by the extended Defense Production Act.

Wide Implications in GM Bus Case

Interest runs high in Justice department charges that General Motors illegally gained a monopolistic position in bus manufacturing. Several legislators commented in effect: "It's just about time." Implications of the case go beyond the bus field: Any decision could have a decided effect in shaping governmental attitudes toward large companies who enter new fields of activity by buying up already established companies. Thinking on that subject by antibigbusiness factions is that a large company's resources automatically give it an unfair competitive advantage.

More Cases at FTC

Not to be outdone by the Justice department, Federal Trade Commission points with pride to its fiscal 1956 record of 42 antimonopoly complaints compared with 36 the year before, an average of 28 for the preceding 10 years. In addition there were 40 FTC orders in antimonopoly cases compared with 30 a year ago, 21.4 average for the ten prior years. No slowdown in activity is likely because FTC's budget for the coming year provides for an expanded staff.

Federal Road Czar?

Congressmen influential in getting the federal highway program approved would like to see an overseer appointed to keep tabs on the world's biggest public works project. Bills introduced in both houses would open up a post of federal highway administrator appointed by the President with the consent of the Senate. Another proposal would create a separate commission to handle the 13-year highway construction program. It would probably absorb the present Bureau of Public Roads, but would not be under control of the Commerce department as BPR is.

Congress Changes Mind

Businessmen who serve in the Executive Reserve — those who sign up would be called to wartime duty in governmental agencies—will not have to file statements about their financial status. The House had put such a provision in its version of the Defense Production Act extension but it was rejected. There were fears such a provision would have kept many executives out of the program.

No Labor Probe—Yet

Calls for a Congressional probe of labor racketeering have been and will continue to be made, but it's not likely anything will be done about them this year because of Congress' desire to get home and start fence mending for fall elections.

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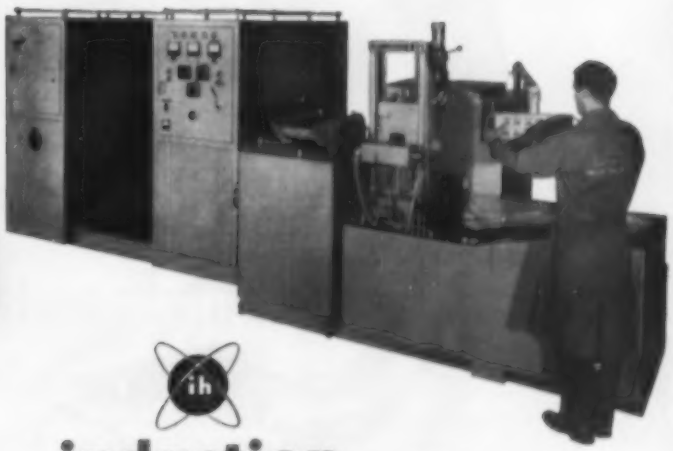

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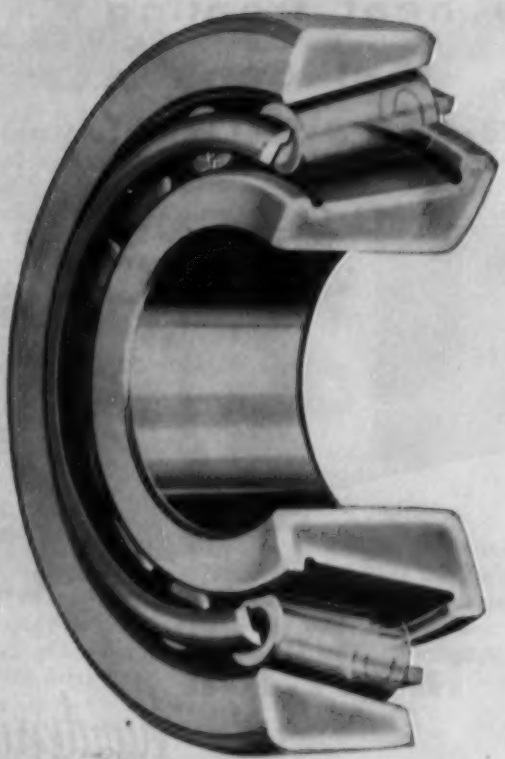

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Carpenter's Britton: Family Man

EMPLOYEES of Carpenter Steel Co., Reading, Pa., recently rejected a union offer to step in as their bargaining agent. It came as no great surprise. They had turned down such a proposition on two previous occasions.

Carpenter, with 2500 employees at Reading, is relatively small as steel companies go. That undoubtedly helps set the stage for mutual respect and trust between men and management. But it takes more than stage props to get results.

People's Choice—Carpenter gets that "more" from men like Arlington A. Britton Jr., its vice president for production. He's on first-name terms with many of the men. He's hailed throughout the mill as "Ollie."

"By tradition," says Mr. Britton, "An important part of our company's personality is that management thinking is directed to the recognition of the worker, as well as problems like output per hour and the production of steels."

Philosophy—He would rather have you call his job one of managing people rather than one of managing a plant. He emphasizes the importance of knowing "a little about the personal life of each employee, and being genuinely interested in his welfare."

He's likely to know who is a new father, who has a son graduating from college, who collects stamps.

Practice—Says Mr. Britton: "We have attempted to break down the relationship between the management of people and the management of things at the different levels of supervision. For instance, I use this illustration: A turn foreman is concerned with about 75 per cent things and 25 per cent people; the general foreman, 50 per cent things and 50 per cent people; the assistant departmental superintendent, 75 per cent people and 25 per cent things." Above this level, "the percentage of concern quite often is 90 per cent people, 10 per cent things."

It pays off if the worker believes that he's not merely a timecard number performing a machine function. "Why not tell a man what happens to the product he is helping make, and about the company's customers and their needs? Taking him into the play has a big part in helping him realize his importance to our operations."

Mr. Britton goes further: "If you can, let the man help to decide which way his job can best be done. If you can show him the problem and tell him how long the company has to get the work out, he will accept the responsibility and take personal pride in the results."

Family Man—Ollie Britton understands Carpenter's men. He started as a 24-year-old mill laborer some 23 years ago. Since then, he has worked through inspection, metallurgy and various management jobs without the benefit of formal college training.

Training, like this at Carrier Corp., is a major way to . . .

Solve Skilled Labor Scarcity

YOUNG Steve Yerek landed a job as drill press operator just 24 hours after he had been released from active military service. Experience: None in industry, but shop courses in high school and brief duty around the motor pool in the army.

Yet a Wisconsin motor control manufacturer snapped him up. "We were lucky to get him," comments the employment manager. "Only one in 20 of the shop people we hire today is really skilled. We'll have to train Steve, of course, but he has a little background and his intelligence is good."

Problem—In a STEEL survey of 1250 plant managers, 22 per cent expected a skilled worker shortage to restrict production in the second half. "The scarcity is worsening," says Associated Industries of Cleveland. "It's outranked in seriousness only by the lack of engineers."

Unless industry does something about the situation, it will get worse, not better. Economists predict that by 1965 we will have to produce 40 per cent more goods with a labor force only 14 per cent larger. And more of that force will have to be skilled because of the growth in automation and other technological progress. "Perhaps one-third to one-half will have to be highly skilled," estimates Isador Lubin, New York State industrial commissioner.

Definition — What is a skilled worker? The answer varies from plant to plant, but generally the definition conforms to Webster's: "One having such training in one occupation as would involve loss in transfer to other occupations."

The key word is "training." It's the most important of four principal ways progressive companies cope with the shortage of skilled labor. The other three: Upgrading, recruiting, conserving what you already have.

Training—Says one training director: "Too many companies kid themselves that they're training with what they call an 'informal, on-the-job program.' It's usually nothing more than the most rudimentary breaking-in process. But even when it's more thorough, it's rarely enough. Some 95 per cent of the people newly hired for shop jobs at our plant need classroom instruction in math, blueprint, gage and instrument reading."

Many companies now have a dual training program for novitiates—an apprentice plan of several years' duration to obtain highly skilled personnel and another of several weeks' or months' time for less demanding skills.

Warner & Swasey Co., Cleveland maker of machine tools, construction and textile equipment, has had an apprentice program since 1880. Some 500 have been graduated in 75 years. A measure of its value: Of the 125 graduates still with the company, 117 are in salaried positions, several in top administrative posts, including E. W. Gressle, manager of industrial relations.

In the last year, more young men have been registering for apprenticeship programs, but the number is still pitifully small—only about 34,000 in selected metalworking trades. One problem, points out George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association. "is that we now have a shortage of apprentice programs."

Far more people are being trained in the short courses, such as that operated by Warner & Swasey. There, a young fellow without much background gets on-

the-job training, plus 35 hours' classroom instruction on company time over three and a half weeks.

The job applicant gets intelligence, mechanical aptitude and other tests. From experience, Kenneth Whelan, the employment manager, knows the range of test scores which often indicates what job a man is suited for. That, plus the employment interview and the observations of the recruit's supervisors and instructors, usually gets him placed properly.

Some 80 per cent of Warner & Swasey's present skilled workers started as learners or semiskilled. They progressed through the various training and upgrading programs.

Upgrading—A second important way to enlarge your reservoir of skilled employees also involves training, but a special kind for a special class of people. It's upgrading existing semiskilled personnel to make them skilled.

Raymond S. Livingstone, Thompson Products Inc.'s vice president for industrial relations, suggests a program whereby Cleveland area companies co-operate in using existing technical high schools and other facilities to train the semiskilled, mostly in their forties and fifties. The northeast Ohio chapter of the American Society of Training Directors, the Cleveland Chamber of Commerce and other groups are studying the proposal.

Thompson is one of a growing number of firms with formal upgrading programs, points out Ted Horton, manager of employee services. The procedure is to take applicants from one skill, promote to the next where training begins. The education includes on-the-job instruction plus "vestibule" training off the job over a three-month period. The program is on two levels: Upgrading from the semi to the medium skilled and from the medium to the very skilled. Medium skills might include broaching, milling and some lathe work. Very skilled work might include Manautrol, engine lathe and some grinding operations.

Applicants are judged by tests after recommendation by the foremen. About 60 usually go through the semi to medium range in three months. Thus far, one group (of 20) has gone through the medium to highly skilled progression.

Does upgrading pay off? Carrier Corp., Syracuse, N. Y., was able to staff a large new production line for defense products in 15 months largely because of its upgrading. More than 65 per cent of 300 welders on one line came from other jobs within Carrier. Over the last five years, more than 3500 men and women have upgraded their skills in the corporation's program.

Recruiting—The third important way to solve skilled labor shortages is through recruiting. But don't expect too much. Warner & Swasey estimates that only 5 per cent of the factory personnel it hires are actually skilled.

Newspaper advertising turns up the greatest number of applicants for most companies, but not the greatest number of people hired. Personal referrals by employees result in the highest caliber of applicants. Many companies have introduction cards that employees can give to potential applicants. The employing personnel give particularly prompt and careful consideration to those card holders.

Employment managers are turning more and more to recruiting in high schools and technical institutes to get the potential skilled worker, just as they go to the colleges for engineers. That's expensive—one reason why the cost just to hire one man probably now averages $100. And the expense may reach an average $500 to recruit and train a man before he's actually paying his way.

Other Approaches—Other ways exist, of course, to solve your skilled worker problem. Work more overtime, but there's a limit to that. Break down the job into simpler parts, but that's chiefly applicable to mass production industries where it already has been explored. Hire moonlighters (people with other full-time jobs), but that's generally frowned on. Or pirate, but enough said.

Yet there is one other approach that will pay off: Conserve what you already have. If you can keep your monthly turnover rate at less than 2 per cent, you're doing well. The average is about 3.5 per cent.

Conservation — You can keep your skilled help by keeping competitive on wages and benefits, by offering some overtime, by promoting from within, by improving your plant conditions.

Steel Improvement & Forge Co., Cleveland, maintains a surprisingly low turnover rate despite the hot and noisy nature of forging operations. Says its training director, W. J. Weiss: "Our own research and joint projects in which we participate have already resulted in less vibration, cooler operations. The men are reasonable when they know of the progress we've made and that we're still tackling the problems."

Conclusions—In a skilled labor force of more than 65 million, we have only 8.5 million craftsmen. We'll need three or four times that many by 1965.

Are you doing your part to train the young or even the 40-year-old Steve Yereks in the labor force?

Use the Skills You Have

An office equipment manufacturer keeps a dossier on all the known skills of every hourly rated person in its employ.

Periodic review and interview with every employee by a supervisor or industrial relations representative checks the accuracy of the file and brings it up to date.

Findings: In every round of interviews, the interviewer learns that employees have some unrecorded higher skills or are working at jobs requiring less than the full known skills in about 5 per cent of the cases. Another 5 per cent say they wish to train for higher skills.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

How Great Lakes Steel *molds* quality

As molten pig iron gushes from the world's largest blast furnace, a generous cupful is ladled out into small, trough-like molds.

Cooled and solidified, these "guinea pigs" (samples of the iron that goes into open-hearth steelmaking) are then rushed to Great Lakes quality control laboratories. For they hold a big chunk of the secret to producing steel that meets customer specifications *all down the line!*

They tell if the blast furnace burden is precisely balanced. They tell if as many impurities as possible have been eliminated. They help tell just what "seasoning" must be added to the open hearth charge, so every batch of steel has the desired chemical composition and drawing qualities—and no buts about it!

Quality control *every* step of the way! That's our job at Great Lakes Steel . . . that, and the kind of service you expect—*and get*—from just one phone call.

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LARGEST IN THE WORLD and first with a hearth diameter of over 30 feet, the No. 1 Blast Furnace is one of four at Great Lakes. Thanks to constant control, these furnaces produce iron that, beyond question, spells higher quality steel.

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

A Picture of Trouble

Automotive engineers are studying failure of parts by photographing them as they start to fail. Buick and Ford are developing some novel techniques

BUICK engineers are using high speed cameras to study the failure of transmission parts.

Elmer Green and John Kerr, experimental engineers in charge of the project, explain the procedure this way: Parts are put into a circular steel drum and spun at speeds up to 12,000 rpm (power is furnished by a dynamometer). Pictures are taken when the parts begin to break.

Flickers — Two, 35-mm, wide angle cameras are placed in the lid of the box, along with two, high speed mercury flashes which last only ½-millionth of a second.

A steel band placed around the part is the trigger device. A fine mesh wire screen fits inside the band. Rubber insulation separates these two sections.

Click—When the part starts to disintegrate, it touches the wire screen and sets off the flash. The camera shutter is kept open, so it records the break when the light flashes.

Any part affected by centrifugal force can be tested this way. So far, Buick has been using the method to check out transmission parts, says L. R. Grandy, supervisor of the division's experimental laboratory.

Stators—Latest tests have been run on aluminum transmission stators made by the permanent mold process. Objective: To see if they will hold up as well as the die-cast aluminum stators Buick is using in its '56 transmission.

Tests indicate redesign may be needed to bring the permanent mold stator up to par with die-cast types—even though it withstood speeds double those encountered in operation. Mr. Green reports the break came in a heavy outer rim section where it wasn't expected.

The rim shoulder is too sharp, he thinks. Design engineers may curve it more to spread strains evenly.

Problem—Although photography can play an important part in these burst box tests, Mr. Grandy says the biggest problem is finding a better method of triggering the flash the instant a part starts to let go.

If the contact screen is set too close, wind from a spinning piece can set off the flash before the part breaks. If it's too far away, the unit will be in pieces by the time a picture is taken, he explains.

Vacuum—Buick might take a leaf out of another auto maker's book and exhaust most of the air in the test drum. That's what Ford Motor Co. does in its spin tests at its Dearborn, Mich., scientific lab. The partial vacuum cuts down wind resistance.

Ford uses its tester to check out gas turbine engine parts. It suspends parts from above rather than from a shaft coming up from the bottom of the burst box as does Buick. Power is supplied by a compressed air turbine. Ford can spin parts faster than 50,000 rpm.

Chrysler Starts Stock Plan

Some 20,000 Chrysler Corp. salaried employees are getting a chance to invest in a company stock-U.S. Savings Bonds plan.

Payroll deductions start Aug. 1. Employees can choose between a five-year savings program or a retirement thrift plan, proceeds of which will supplement retirement income.

Employees may save up to 10

Ford exhausts the air in a test drum for spin tests. A researcher attaches a disk to the quill shaft of the spin tester

Buick engineers mount cameras outside the burst box, to get photos through windows in the lid. Shutters are left open

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per cent of their base salary each pay period, but not more than $2500 in one year. Chrysler contributes to each person's savings an amount which is based on the percentage of the corporation's consolidated net earnings to net sales.

When a worker has saved enough for an investment unit ($31.25 the first year), it is invested in stock and Series E bonds. The amount spent for stocks or bonds depends on the sales-earnings ratio.

Breakdown—If earnings are 5 per cent or less, 40 per cent of a man's savings are invested in stock, 60 per cent in bonds. At 5 to 7 per cent, the money is split half and half. Over 7 per cent, 60 per cent goes into stock; 40 per cent into bonds.

In all cases, the company matches the amount which is allocated for stock. The plan includes a guarantee to protect savings. Employees may withdraw their own stock and bond investment at any time, but they have to remain in the plan five years to get the benefits of the corporation's contribution.

Follow-Up—Ford and GM employees enjoy similar benefits. The GM stock plan has been in effect since last October. The company reports that 88 per cent of its eligible employees participate.

Ford's system went into operation early this spring after hourly employees had the first crack at it (before Ford offered its stock on the open market).

UAW leaders turned down the plan despite bitter cries from workers. Reason: Stock ownership spells capitalism, something the union wants its members to avoid.

Of Things To Come

Arch T. Colwell, vice president, Thompson Products Inc., Cleveland, predicts production marks of 9 and even 10 million cars annually within a few years.

He bases his forecast on the estimated population increase and the fact that more families are buying extra cars as they move to the suburbs.

Mr. Colwell also says fuel injection systems will appear on piston engines before the gas turbine power plant makes its bow on production models. He figures the turbine will come when present production equipment wears out.

Hydraulic and pneumatic cushions soon will replace springs and shock absorbers in suspension systems, Mr. Colwell adds. The auto industry looks for air suspension to appear in 1958.

Government Steps In

General Motors Corp., Chrysler Corp., International Harvester Co. and Willys Motors Inc. will get Army truck contracts worth $15.5 million.

The contracts are aimed at bolstering sagging employment in auto factories. Awards are for these amounts: GM, $8.2 million; Chrysler, $3.7 million; Willys Motors, $3.5 million; I-H, $163,000.

In addition, Chrysler has been granted a $3.2 million contract to produce "Jupiter," the Army's new, 1500-mile guided missile. Chrysler expects to subcontract much of the work.

The Air Force has granted a $188.2 million contract to the Aircraft Engine division, Ford Motor Co., to make more J-57 turbojet engines. The orders take Ford's Air Force engine contracts over the billion dollar mark, says John Dykstra, company vice president and group executive.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,141†	649,393
6 Mo. Total	3,192,349†	4,257,154
July		659,763
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
June 9	105,074	134,673
June 16	100,804	139,743
June 23	105,243	151,249
June 30	103,037	158,402
July 7	66,973†	134,092
July 14	101,500*	167,473

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

Ford Expands at Chester

Ford Motor Co., Dearborn, Mich., reports it will almost double manufacturing space at its assembly plant in Chester, Pa.

George T. Vincent, plant manager, says a 45,000 sq ft building to house new car preparation and final inspection departments has been started. It's due for completion early next year.

Another 245,000 sq ft will be made available for assembly line operations by moving stock parts and export operations to the part depot Ford will build at Delair, N. J.

Assembly line modernization calls for two-tone paint lines and body welding fixtures to handle all passenger car body types. The plant makes all but two models—station wagons and the Thunderbird.

Exhaust Notes

Reynolds Metals Co., Louisville, reports that 1957 cars will use an average of 33 per cent more aluminum than this year's models. Cadillac set the pace for aluminum this year. Look for more aluminum trim items to appear on Buick and Oldsmobile lines. Chrysler and Ford are following suit . . . More than 2 million lb of auto parts move through Ford's Detroit part terminal daily. The terminal funnels parts into railroad cars for shipment to 18 Ford and Mercury assembly plants and to other part depots . . . Studebaker division, Studebaker-Packard Corp., now offers overdrive transmissions on its 1-ton, V-8 trucks . . . Buick engineers, using compressed air guns, are simultaneously spraying two colors on fenders. A metal shield, suspended from trim strip holes, sticks out at right angles the length of a fender. It prevents paint from splashing or overlapping between top and bottom of fenders.

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

SUPERIOR QUALITY of INNER RACES

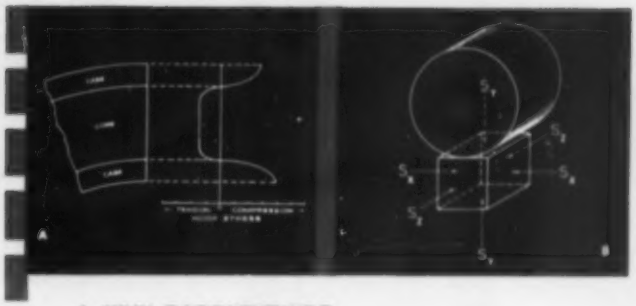
The function of an inner race is to provide a fatigue-resistant surface between a shaft and the bearing rollers. Because of roller bearing geometry, there is a smaller area of contact between inner race and rollers than between outer race and rollers. This concentrates more load on the inner race and makes it the critical member from a fatigue life standpoint, particularly when the inner race is the stationary member and maximum load is repeatedly applied at one point.

Since it is vital to good performance that the inner race does not work loose on the shaft, HYATT inner races are designed for relatively heavy press fits, so the inner race becomes an integral part of the shaft for all practical purposes. Other advantages of HYATT'S carburizing process and precision finishing operations are briefly explained at right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your design requirements. Remember, HYATT is America's *first* and *foremost* maker of roller bearings. Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.

GM GENERAL MOTORS

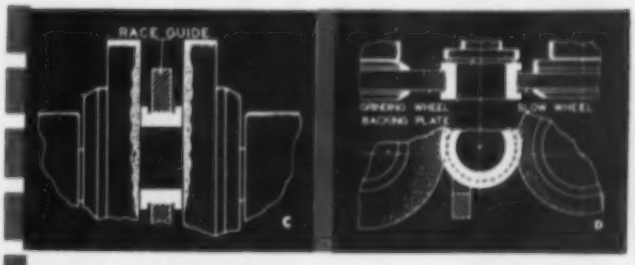
HYATT ROLLER BEARINGS



1. WHY CARBURIZING?

Carburizing provides inner races with tough cores, and flanges that will not crack, with no loss of case hardness. This permits tight press fits and also improves load-carrying capacity as shown in Diagram A. During quenching, a volumetric change tends to stretch the core and compress the case. Due to the Poisson effect, the compressive hoop stresses in the external fibres build up the load-carrying capacity.

Diagram B shows a typical element under roller load. Stresses in the "Z" direction are negligible; those in the "X" direction are compressive hoop stresses or pre-load. Those in the "Y" direction are compressive stresses due to the load. Without the compressive stress Sx (hoop stress) the load capacity would be reduced; and if "X" were a tensile stress due to pressing a through-hardened race on a shaft, the bearing capacity would be still less.

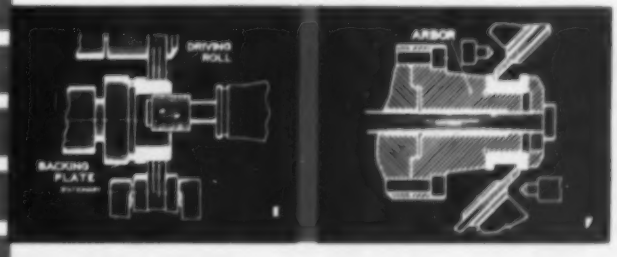


2. DOUBLE END GRIND

In grinding a HYATT inner race, the ends are first faced off square and parallel so they can be used as accurate reference during subsequent operations. The HYATT double end grind process (Diagram C) insures excellent control of parallelism.

3. CENTERLESS PATHWAY GRIND

Centerless grinding was pioneered by HYATT years ago, and eliminates excessive wall variation due to spindle and chucking errors. This method produces as nearly a perfect cylinder as is commercially practical. Two-point and three-point out of round and taper are held to a minimum. Note how work is rotated with backing plate against previously ground end (Diagram D) to insure accuracy.

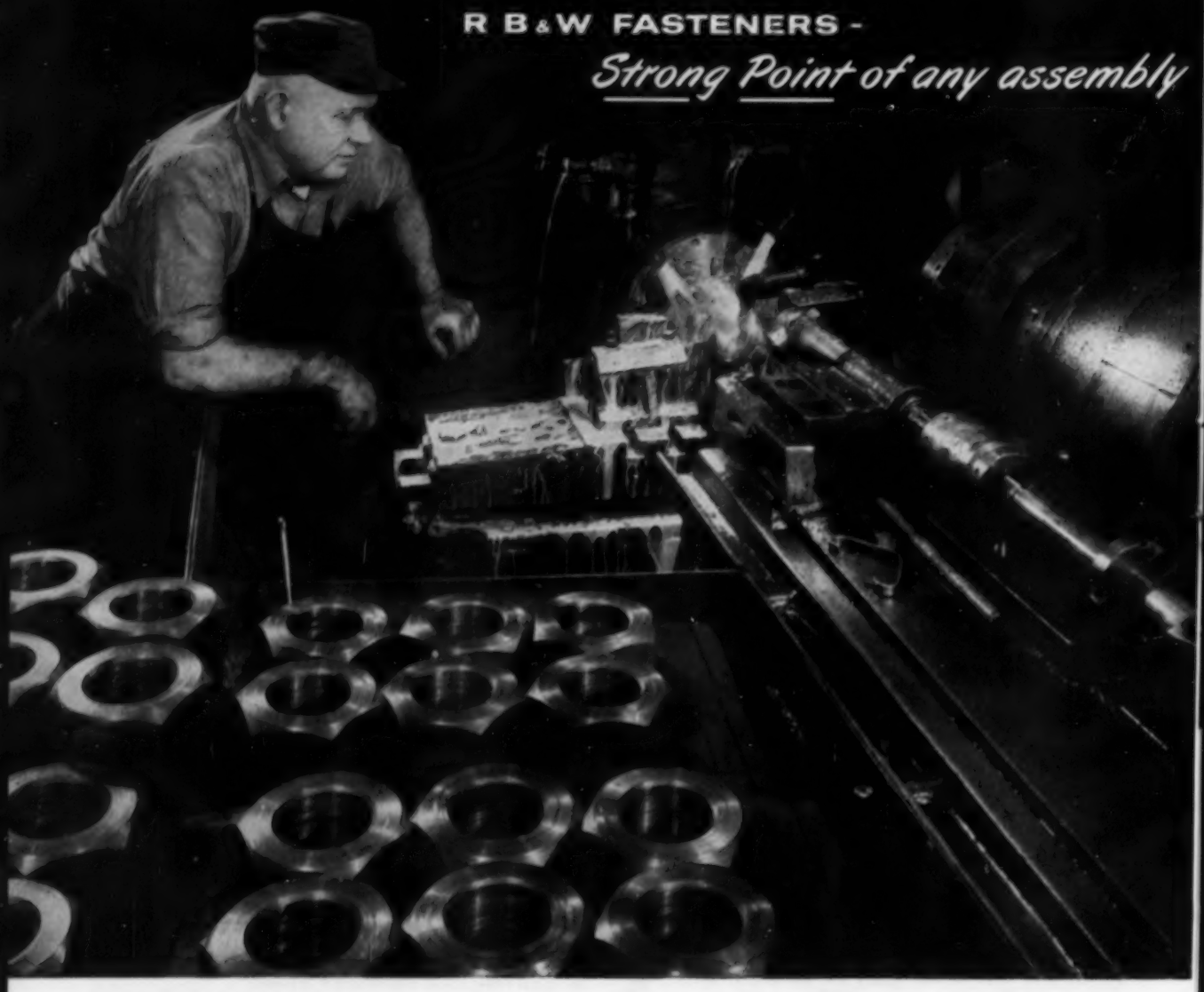


4. CHUCKLESS BORE GRIND

Here the centerless method assures a bore concentric with the pathway, with minimum wall variation, by removing stock from high spots as they pass between drive roll and related grinding wheel (Diagram E).

5. FLANGE GRINDING

To assure that they will run true with roller pathway, flange faces are also ground using the squared ends for reference (Diagram F). This establishes even contact with roller ends during bearing operation.



Going to extremes to satisfy every need in fasteners

WHAT's the size-limit on nuts? Pretty high at RB&W, as you can see from the 4" giants above. At the other extreme, RB&W produces nuts down to ¼". Everything in between, too.

Most are made on automatic nut formers. Big stuff gets milled from hex bars, and needs more personal attention. Frank Culko, long on skill and precision, is shown keeping his expert eye on the operation. Like so many other RB&W craftsmen, he's been with the company for well over 20 years.

There's plenty of production skill and experience, plenty of facilities behind the avalanche of nuts flowing from RB&W. In fact, it was RB&W that developed the first cold-punched-nut machine, the first continuous automatic nut tapper, and pioneered the cold forming process. Also a fact: RB&W recently invested millions of dollars in bolt and nut making equipment to expand capacity.

RB&W goes all out on quality control, too... with a program recognized as the finest of its kind.

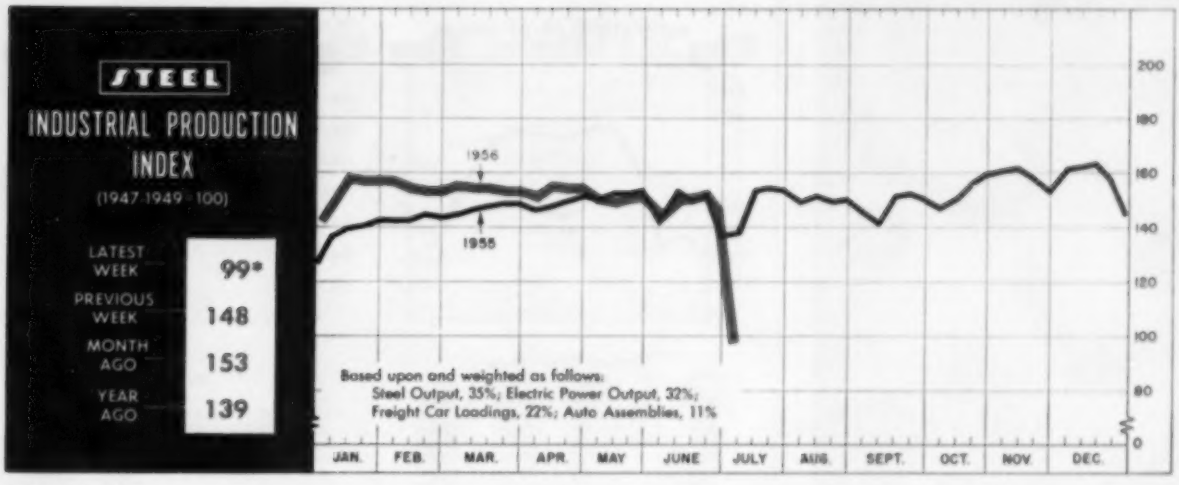
What does all this mean to *you*? More quality for your money. A truly reliable source of supply. Strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N.Y.

R B & W

110th year

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.



*Week ended July 7

Economy Still in High Gear Despite Strike

FULL IMPACT of the steelworkers' strike on the nation's economy hasn't hit yet and probably won't until after the two-week mark. Even then, it probably won't be felt as much as some similar strikes in the past.

The economy stands to lose in two primary ways: Production and wages. Both will slow things down somewhat, but they won't bring a screeching halt to the boom.

Production—A large percentage of steel users were in pretty good shape at the start of the strike. Except for construction and manufacturers using structurals and plate, industrial production will continue several weeks before a shortage takes hold. But as one major appliance maker told STEEL: "As long as the steelworkers had to strike, they picked a pretty good time. Vacation schedules normally cut back production anyway. We've been subjected to this before, and we're getting philosophical about it." He feels that the strike, especially if it is a long one (six weeks or more) will siphon off inventories from raw materials through to end product.

Most production outside the basic steel industry will roll along, for a while at least, almost normally. Once vacations are over, there may be some worries late in August.

Wages—Workers, too, went into the strike better fortified than in the past. Personal income has risen every month this year and is at a rate about 7 per cent above the first half of 1955. Personal savings have kept step and are now at an annual rate of more than $18 billion. Thus far, merchants report there has been no evidence of any dropoff in business. Traffic through stores has been heavy in July. Appliance dealers feel they will have a good July, especially if the weather turns warmer. They reason this way: Many metalworking plants are closing down for vacations. Workers in these plants will be free to shop with vacation pay in their pockets. Steelworkers

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	312	302	2,202
Electric Power Distributed (million kw-hr)	10,900[1]	11,498	9,759
Bituminous Coal Output (1000 tons)	7,065[1]	10,230	2,180
Petroleum Production (daily avg—1000 bbl)	7,000[1]	7,034	6,595
Construction Volume (*ENR*—millions)	$389.8	$415.9	$378.9
Auto, Truck Output, U. S., Canada (*Ward's*)	89,674	135,003	167,288
TRADE			
Freight Car Loadings (1000 cars)	755[1]	650	653
Business Failures (Dun & Bradstreet)	275[1]	249	204
Currency in Circulation (millions)[3]	$30,763	$30,485	$30,298
Dept. Store Sales (changes from year ago)[3]	+7%	+6%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,214	$23,358	$18,281
Federal Gross Debt (billions)	$272.7	$272.3	$274.4
Bond Volume, NYSE (millions)	$12.3	$14.1	$17.0
Stocks Sales, NYSE (thousands of shares)	7,874	9,000	11,656
Loans and Investments (billions)[4]	$85.6	$86.3	$84.5
U. S. Govt. Obligations Held (billions)[4]	$26.6	$27.1	$32.1
PRICES			
STEEL's Finished Steel Price Index[5]	210.45	210.45	207.63
STEEL's Nonferrous Metal Price Index[6]	275.7	275.7	238.9
All Commodities[7]	113.8[1]	113.8	110.0
Commodities Other Than Farm & Foods[7]	121.4[1]	121.4	115.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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THE WHELAND COMPANY
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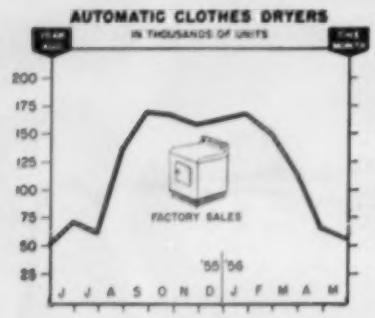
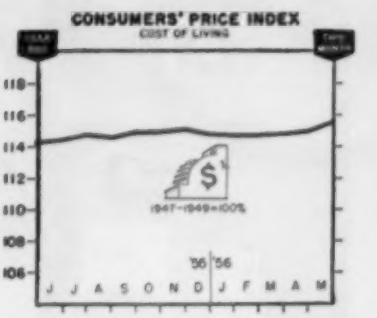
THE BUSINESS TREND





Factory Sales—Units	1956	1955	1954
Jan.	166,243	115,383	62,196
Feb.	148,522	109,215	62,458
Mar.	113,031	113,498	51,796
Apr.	64,923	73,978	37,661
May	55,330	49,228	26,533
June	.....	70,616	30,297
July	.....	60,516	49,755
Aug.	.....	136,190	80,165
Sept.	.....	165,905	107,084
Oct.	.....	166,889	122,182
Nov.	.....	157,153	138,254
Dec.	.....	161,823	115,341
Totals	.....	1,384,394	897,751

American Home Laundry Mfrs. Assn
Charts copyrighted. 1956. STEEL

	1956	1955	1954
Jan.	114.6	114.3	113.2
Feb.	114.6	114.3	113.9
Mar.	114.7	114.3	114.8
Apr.	114.9	114.2	114.6
May	115.4	114.2	115.0
June	....	114.4	115.1
July	....	114.7	115.2
Aug.	....	114.5	115.0
Sept.	....	114.9	114.7
Oct.	....	114.9	114.5
Nov.	....	115.0	114.6
Dec.	....	114.7	114.3

U. S. Bureau of Labor Statistics

won't have as much money, but usually it takes about three missed paydays to slow down their purchases. Then they'll dig into savings. In addition, many consumers are looking to the price picture after the strike is settled. They want to buy now and avoid increased prices.

All of this, dealers believe, will help reduce inventories on all lines of appliances. This will feed back to the manufacturers and help them reduce their stocks. Inventories run up to 60 days or more in most appliances except air conditioners. If the weather gets exceptionally hot, there will be a pinch here.

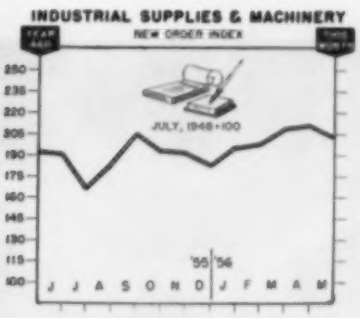
Thus, the year could still end up in the plus column for appliance makers. Laundry equipment manufacturers, for instance, are running well ahead of last year in factory sales (see chart above) and expect to hold that gain. Radio and television set manufacturers are taking heart at the recent upturn in sales. April showed gains for both appliances.

Employment Sets Record

Building up to the midyear point, employment set an alltime high in June, Commerce and Labor departments report. The total edged over the old record of 65.5 million set last August. Unemployment rose, too, as students entered the labor market last month. While the workweek lengthened less than seasonally, it was enough to boost the average earnings of factory employees $1 a week, setting a new high in that department, too. Thus, there is money to be spent, and the trend indicates it is being spent. The big damper in this respect is the rising cost of living. There is a great deal of talk about the wage-price spiral, and the rising trend of the government's consumers' price index (see chart above) is proof that it isn't all just talk.

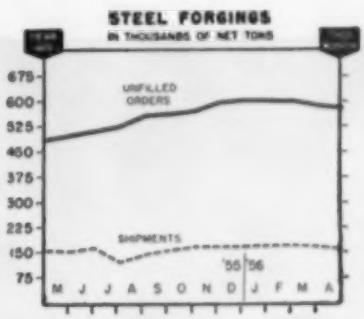
Production Index Drops

The Fourth of July, the coal miners' vacation and the beginning of the steel strike plunged STEEL's industrial production index to the lowest point since the steelworkers' strike in 1952 (see chart, page 99). While most of the loss is attributed to steel, autos also contributed heavily as motordom turned out only about 80,000 cars and trucks for the week ended



	1956	1955	1954
Jan.	192.7	164.4	139.8
Feb.	195.9	175.1	148.8
Mar.	206.7	186.9	141.5
Apr.	208.6	173.7	131.9
May	200.6	191.6	129.4
June	....	189.1	136.4
July	....	163.7	119.4
Aug.	....	181.2	132.8
Sept.	....	203.2	145.1
Oct.	....	190.0	136.3
Nov.	....	189.7	146.2
Dec.	....	180.0	148.8

Amer. Supply & Machinery Mfrs.' Assn.



	Shipments		Unfilled Orders	
	1956	1955	1956	1955
Jan.	160	136	589	453
Feb.	152	135	589	460
Mar.	150	154	578	479
Apr.	150	150	569	475
May	...	147	...	488
June	...	155	...	501
July	...	115	...	513
Aug.	...	135	...	527
Sept.	...	149	...	553
Oct.	...	158	...	560
Nov.	...	158	...	585
Dec.	...	158	...	592

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.

July 7. That's the lowest total since the week ended Oct. 23, 1954. The low production is expected to make a sizable reduction in dealers' stocks of new cars, which are now at about the 700,000-unit level.

The production index is not yet at the bottom of its descent. As steel users run short, it will cause reductions in workweeks and cut into both freight carloadings and, to a lesser extent, electric power output. Even steel production could drop another notch. About 13 per cent of the industry's capacity is still in operation. Unless the strike is settled soon, more contracts and extensions could expire, shutting down much of that 13 per cent.

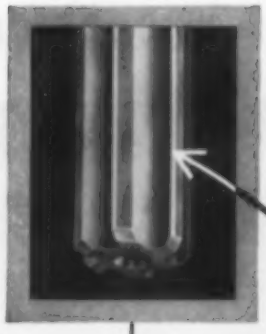
Construction Slows Down

The construction boom is losing a little of its steam, but barring a serious shortage of structural steel, it should still set a record for the year. *Engineering News-Record* reports that contracts for heavy construction set a record for June at $1.6 billion. This was 8 per cent ahead of the corresponding month last year, but it dipped 4 per cent below the previous month. It marked the third consecutive monthly decline, but still leaves 1956 to date 21 per cent ahead of the corresponding period of last year.

Worst Yet To Come

Bookings for fabricated structural steel indicate a slight slowdown in heavy construction. At 358,271 tons in May, they were about 21,000 tons beneath the April level. Shipments moved close to the record level of March, but still fell short of bookings. Thus, the backlog of orders increased to a record 2,895,660 tons. June will continue the present trend, but the July report of the American Institute of Steel Construction will show a big decrease in shipments with a corresponding hike in unfilled orders.

The same can be said for shipments of industrial supplies. There is no evidence that the steel industry shutdown has dampened the general industrial expansion picture, so new orders for equipment will continue at a high level (see chart on this page). But producers of these supplies are among the first to be affected by the strike, so shipments will sag and order backlogs will build up.



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INDUCTION HEATING EQUIPMENT

Is heating or heat-treating involved in your metal-working process?

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For example, Magnethermic has designed high frequency equipment for continuous localized heat-treating of electric welded pipe. Another Magnethermic installation pre-heats 32" diameter aluminum ingots, weighing 5,000 pounds, prior to extrusion.

Magnethermic's plant at Youngstown houses diversified facilities and specialized personnel devoting full time to induction heating, Low, Dual and High frequency.

Whether your inquiry concerns heat-treating, hot working or joining, Magnethermic can do the job. For specialized, intelligent attention, *place your inquiry with the specialist—Magnethermic.*

A. H. JACKSON
. . . Blaw-Knox equipment div.-v. p.

GARRETT B. LeVAN
. . . Mallory-Sharon rod and bar mgr.

JACK PETERS
. . . gen. mgr., Jervis B. Webb (Calif.)

Blaw-Knox Co. appointed **A. H. Jackson** vice president-general manager of its equipment division plant at Blawnox, Pa. He succeeds **Capt. E. C. Rook,** recently made vice president-general manager of the fabricated products group.

William Wilson fills the new position of director of research and development at **A. Finkl & Sons Co.,** Chicago. He was supervisor of metallurgy at Ekco Products Co., and research metallurgist at Armour Research Foundation.

John A. Johnson was appointed division manager of National-Standard Co.'s **Athenia Steel Division,** Clifton, N. J. He replaces the late **M. E. Murphy.**

James R. Hanlon was made general sales manager, **D. C. Fonda Gage Co.,** now located at 200 Henry St., Stamford, Conn.

William O. Hoverman was made sales manager for **General Electric Co.'s** semiconductor products department at Syracuse, N. Y.

Latrobe Steel Co., Latrobe, Pa., appointed **David P. Hughes** chief metallurgical engineer, responsible for activities of the metallurgical laboratory directory related to sales. He was formerly connected with development and evaluation of new products and new fields of tool steel applications.

Garrett B. LeVan was appointed manager of rod and bar operations, **Mallory-Sharon Titanium Corp.,** Niles, O. He was general manager of the Titusville, Pa., plant of Universal Cyclops Steel Corp.

Marshall E. Munroe Jr., director of procurement for **Massey-Harris Ferguson Inc.,** Racine, Wis., was elected a vice president. He will continue to supervise purchasing for all M-H-F plants as well as coordinate phases of supply and control with other divisions of the company.

Kenneth R. Fisher was elected president, **Super Tool Co.,** Detroit subsidiary of Van Norman Industries Inc. and acquired in 1955. Mr. Fisher had been at Super Tool for eight years, as sales manager and as executive vice president.

W. W. Higgins was made chief engineer, **A. O. Smith Corp.,** Milwaukee. He was engineering director at the Permaglas Division, Kankakee, Ill.

Michigan Chemical Corp., St. Louis, Mich., appointed **Dr. Adrian M. Gammill** director of its rare earths and thorium division.

Myron L. Chase joined the New York office of **Luria Bros. & Co. Inc.** He was a vice president of Luntz Iron & Steel Co.

Jack Peters was made general manager, **Jervis B. Webb Co. of California,** Los Angeles. He succeeds **Paul Kuhn,** retired vice president-general manager, now acting on a consulting basis.

Lt. Gen. Elwood R. Quesada was elected chairman and chief executive officer of **Topp Industries Inc.,** Los Angeles. He retired from the Air Force in 1951 and subsequently joined Lockheed Aircraft Co. as vice president-general manager of its missile systems division.

A. Murray McLean was appointed works manager, **Vanadium-Alloys Steel Canada Ltd.,** London, Ont., Canada. He was formerly with Atlas Steels Ltd. for 14 years.

J. B. Maupin was made division manager, **Mall Tool Co.,** Chicago, a division of Remington Arms Co. He is succeeded by **Douglas E. Miller** as works manager at Remington's Ilion, N. Y., works.

V. W. Wyatt, plant superintendent, was made works manager, **Toledo Scale Co.,** Toledo, O., following resignation of **W. G. Dollmeyer,** vice president-manufacturing.

J. Harold Slingerland was made midwest regional manager for **Plasteel Products Corp.** He is located in new offices, Lakeview Bldg., 116 S. Michigan Ave., Chicago. Mr. Slingerland was former-

ly vice president-general sales manager, Cummins Portable Tools.

Wausau Iron Works, Wausau, Wis., named **N. R. Gahnz** general sales manager; **Russell W. Theisen**, assistant sales manager; and **H. J. Leila**, purchasing agent.

Crane Co. appointed **Harold H. Stift** Chicago branch manager to succeed **Thomas D. Kelly**, who becomes midwest district manager. Mr. Stift is succeeded as assistant manager by **Donald R. MacCrimmon**. **Frank R. Perry** was made Los Angeles branch manager succeeding **Darrell R. Nordwall**, now northeastern district manager. **Leo F. Regan** was made assistant branch manager at Springfield, Mass.

W. E. Galland was appointed manager, solids pump division, **Western Machinery Co.**, San Francisco. He replaces **G. Y. Murray**, who now heads western sales activities of Western Knapp Engineering, subsidiary.

Dr. Robert O. Fehr was appointed manager of **General Electric Co.'s** mechanical engineering laboratory at Schenectady, N. Y.

E. W. Gilmore was made manager of the Tulsa, Okla., branch office of **Kaiser Aluminum & Chemical Sales Inc.**

Kenneth N. Bundy was made assistant superintendent of **Wheeling Steel Corp.'s** by-product coke plant, Steubenville, O.

Lloyd H. Mattson, manufacturing engineering cost reduction specialist at **General Electric Co.'s** Edmore, Mich., metallurgical products department, permanent magnet plant, was made manager of the materials subsection.

T. O. Zittel succeeds **R. W. Graham**, retired, as superintendent, electrical department, at **Bethlehem Steel Co.'s** Lackawanna, N. Y., plant. **C. L. Squier** succeeds Mr. Zittel as assistant superintendent.

Herbert Geittman Jr. was placed in charge of development of castings for the machine tool industry at **Climax Molybdenum Co.** He is at Detroit. He joined Climax a year ago as a cast iron specialist.

OAKLEY B. MITCHELL

HENRY W. KREIFELDT

. . . Morton Mfg. purchasing agent, sales manager

Oakley B. Mitchell was made purchasing agent and **Henry W. Kreifeldt**, sales manager of **Morton Mfg. Co.**, Muskegon Heights, Mich. Mr. Mitchell was assistant purchasing agent. Mr. Kreifeldt served as a sales engineer of machine tools, special machinery and automatic welding machinery.

Fred L. Shanklin was elected president of **Union Carbide Ore Co.**, a division of Union Carbide & Carbon Corp., New York. He succeeds **F. S. Haggerson**, resigning for reasons of health. Mr. Shanklin was vice president-general manager.

Racine Hydraulics & Machinery Inc., Racine, Wis., appointed **Robert Veraar** assistant sales manager, hydraulic division. He succeeds **George W. Christiansen**, now marketing manager, machinery division.

General Motors Corp., Detroit, elected **Edward N. Cole**, **Semon E. Knudsen** and **Herman F. Lehman** vice presidents. Mr. Cole was recently made general manager, Chevrolet Motor Division; Mr. Knudsen, general manager, Pontiac Motor Division; and Mr. Lehman, general manager, Frigidaire Division.

John W. Gasink joined **Fasco Industries**, Rochester, N. Y., as controller to succeed **Harold A. Ketchum** who resigned to become vice president of Federal Pacific Electric Co. Mr. Gasink was vice president-finance, Scott - Atwater Mfg. Co.

John B. Seastone was appointed director, technical division, **Olin Mathieson Chemical Corp.**, at New Haven, Conn. He was research-development manager for the metals division.

Karl H. Kostenbader Sr. was made superintendent of foundries at **Bethlehem Steel Co.'s** Bethlehem, Pa., plant. He succeeds **Clarence A. Bever**, retired. **Jesse H. Muir** succeeds Mr. Kostenbader as superintendent of the steel foundry. **James C. McKerihan** becomes assistant superintendent, steel foundry. **Amos L. Proctor** was made assistant superintendent, brass foundry; and **John B. Stevens**, assistant superintendent, iron foundry.

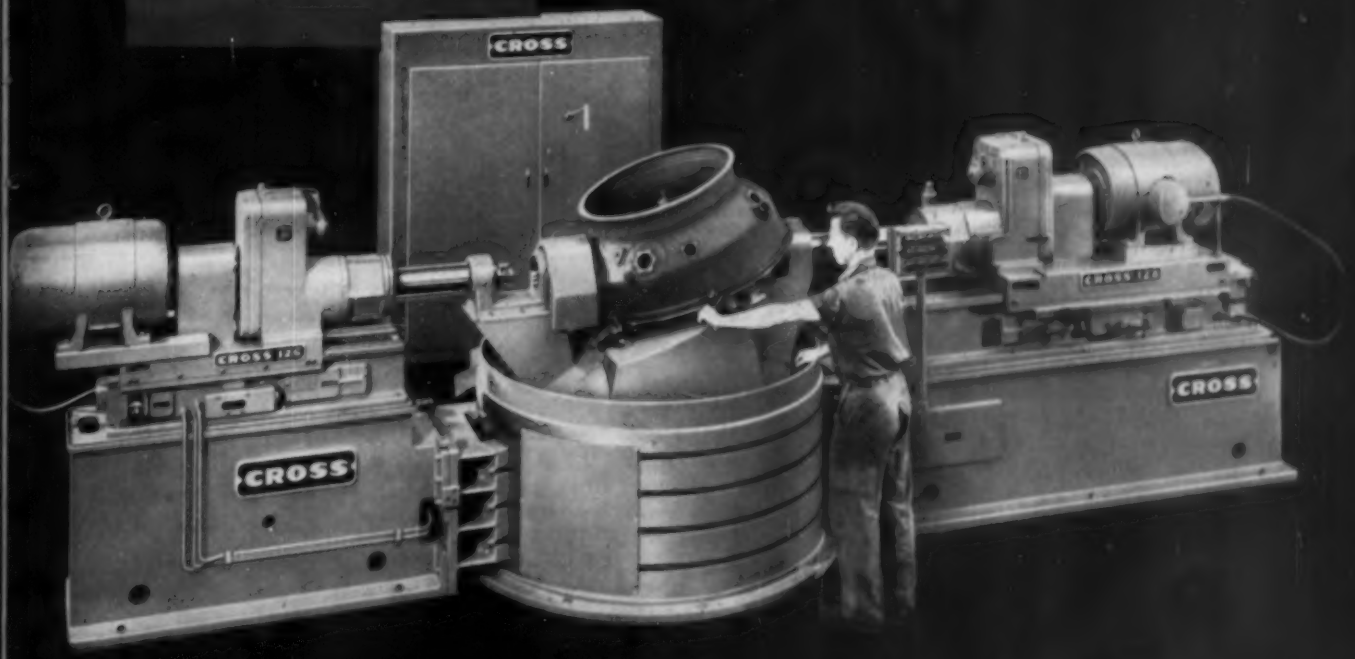
William E. Bussen was made manager of vitrified sales for **Laclede-Christy Co.**, division of H. K. Porter Company Inc. at St. Louis.

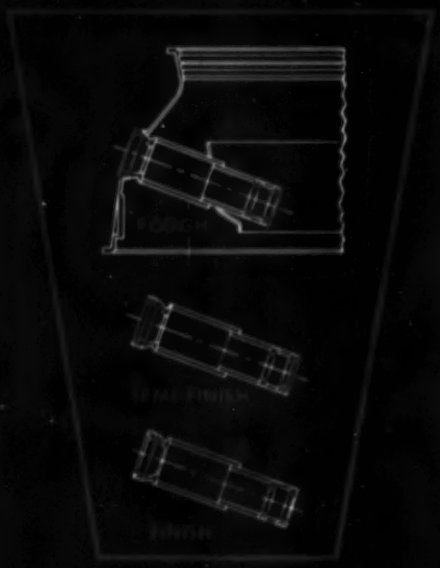
James O. Burke was elected president of **Standard Coil Products Co.**, Melrose Park, Ill., to succeed **Glen E. Swanson**, now chairman.

Weldon D. Willes was named assistant to the president of **Rockwell Mfg. Co.'s** recently acquired Locomotive Finished Material Division, Atchison, Kans. He was product manager - Nordstrom valves at Pittsburgh. **Harold F.**

Precision Bores and Faces Diffuser Cases

Another Special by Cross





This Two-Way Boring Machine roughs, semi-finishes and finishes the accessory drive shaft hole of Jet Engine Diffuser Cases at the rate of 2½ pieces per hour. The operator places the part in the work holding fixture and the rough boring cutters in the boring spindles, after which the rough boring is performed cutomatically. Next, the operator replaces the rough boring cutters with semi-finish boring cutters and the cycle is repeated for the semi-finish boring operation. Then, the finish boring operation is performed in a similar manner and the part is removed.

The cutters are supported in live precision bearing spindles, which are in turn supported by hardened and ground steel bushings adjacent to the work.

All cutters are pre-set for size and are quickly and easily changed for the different operations.

To provide maximum flexibility for future part design changes, the machine is built with Cross Modular "Building Block" Units.

Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

KARL W. MUELLER
. . . Crown Cork & Seal v. p.-mfg.

ROBERT L. PURCELL
. . . Siegler Corp. executive v. p.

FRANCIS H. GIBSON
. . . South Chester Tube v. p.-sales

Martin was made product manager-woodworking tools at Pittsburgh.

Karl W. Mueller was elected vice president and director of manufacturing, **Crown Cork & Seal Co. Inc.**, Baltimore. He was vice president-operations at Trailmobile Inc.

Pastushin Industries Inc., Los Angeles, elected **Kenneth C. Walkey** vice president-general manager.

E. P. Withers Jr. was made manager, specialty products and maintenance department, **Davidson-Kennedy Co.**, Atlanta.

Von Kaufman was elected vice president-general manager, **Hayes Steel Products Ltd.**, St. Catherine, Ont., Canada, subsidiary of Dana Corp. He succeeds **J. W. Primeau**, resigned.

Edwin D. Howell, effective July 31, will become general manager of the three manufacturing divisions of **Revere Copper & Brass Inc.**, New York, which produce Revere ware. **C. M. McCreery**, vice president in charge of the divisions, will retire on that date.

Robert L. Purcell was elected executive vice president, **Siegler Corp.**, Chicago. He was vice president and secretary.

Yale Materials Handling Division, Philadelphia, **Yale & Towne Mfg. Co.**, appointed **Robert L. Brown Jr.** manager, electric truck sales; **Fred E. Rau**, manager, hoisting equipment sales; **W. B. Hood** and **J. H. Eichert**, assistant hoist sales managers; **W. S. Woodward**, New York State district sales manager, located at Syracuse; and **C. E. Howard**, manager of attachments.

Herbert B. Seymour Jr. joined **Wonder Building Corp. of America**, Chicago, as general sales manager. He was dealer development manager for Stran Steel Corp.

Roger K. Furse joined **Universal-Cyclops Steel Corp.**, Bridgeville, Pa., as superintendent of its cold finishing department. He was supervisor of hot and cold rolling at the Blairsville plant of Westinghouse Electric Corp.

John E. Stukel joined the ore sales department of **Cleveland - Cliffs Iron Co.**, Cleveland, as metallurgical sales engineer. He was with Youngstown Sheet & Tube Co.

Francis H. Gibson was elected vice president - sales, **South Chester Tube Co.**, Chester, Pa. He was general sales manager.

Copeland Refrigeration Corp., Sidney, O., named **E. R. Boynton** chief engineer and **Oskar H. Buschmann**, vice president - engineering.

Charles H. Crawford and **W. W. Wood** were elected vice presidents of **Colonial Broach & Machine Co.**, Detroit. Mr. Crawford is plant manager. Mr. Wood is general manager, Colonial Bushings Inc., an affiliate.

E. W. Bliss elected **George T. Pfifer** vice president - finance at Canton, O.

National Screw & Mfg. Co. appointed **Alexander I. Stayman** and **Edwin L. Bartsch** district sales managers. Mr Stayman, former vice president-sales at Pittsburgh Screw & Bolt Co., will head sales in greater Pittsburgh and the Ohio Mahoning valley. Mr. Bartsch, former general sales manager, Oliver Iron & Steel Co., will cover the northwest Ohio territory, including South Bend, Ind.

OBITUARIES . . .

Paul C. Nicholson, 67, chairman, **Nicholson File Co.**, Providence, R. I., died June 28. He also was chairman of American Screw Co.

William H. Sayre, 57, president, **American Abrasive Metals Co.**, Irvington, N. J., died June 29.

Philip Arnold, 73, retired vice president, **Garlock Packing Co.**, Palmyra, N. Y., died July 3 in Carmel, Calif.

Daniel C. Plummer, 59, chairman, **Nu-Enamel Corp.**, Chicago, died June 30.

New Kearney & Trecker's "Bull's-Eye" Control Grouping

Available under Tool-Lease program

TF Series milling machine's controls are conveniently grouped up-front where they belong to assure accurate settings ...measurably reduce operator fatigue

ONE look tells why the new TF Series milling machines — Plain, Universal and Vertical — are so easy to operate. "Bull's-eye" up-front control grouping permits operators to achieve exact settings faster, more adeptly and with greater ease than ever before. This "Fron-Trol" convenience is the key to low-cost production . . . because it increases the operator's efficiency and measurably reduces fatigue through elimination of wasted steps.

The "bull's-eye" knee and saddle-mounted controls are safety-interlocked and include feed selection, directional Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, front-mounted table handwheel, saddle clamping gib and backlash eliminator and hand and power directional controls for knee and saddle movements.

In addition, the new TF's give you a superior combination of outstanding design and operating features never before available on any other knee-type milling machines. They're built in five sizes — No. 2 to No. 6 from 10hp to 50hp.

Why take less than the latest when you want new milling machines? You can get all the facts on new TF Series machines from your Kearney & Trecker representative — call him or mail coupon direct to factory today.

A few of many reasons why TF Series milling machines are so easy to operate

Twin Screw Knee Support — Exclusive double-support arrangement most effectively distributes weight of new machines' much wider, heavier knee, saddle and table. Balanced design substantially increases stability under heaviest loads . . . offers greater resistance to torsional thrust under all cuts . . . halves the wear factor, assuring greater, longer-lasting accuracy.

Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.

Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a pair of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life . . . excellent finish . . . quieter and vibrationless operation.

Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine maintenance.

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BUILDERS OF PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

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Please send me Catalog No. TF-50 with details on new line of TF Series Plain, Universal and Vertical milling machines.

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How to operate over plant capacity

Is your plant up against the "capacity barrier?" There *is* a way to increase output without additional capital outlay.

Island Creek coking coals can help you get higher production because their uniformly low ash and sulphur content produce improved coke that gives lower coke rates and decreased slag volume, resulting in more hot metal . . . even cuts the cost per ton of iron produced.

It's more than a theory. It's being done . . . by leading producers who depend on Island Creek as a major source of quality coking coals.

We'll leave the rest of the story, the technical side, up to Island Creek coking coal specialists. They'll welcome an opportunity to discuss it with you.

YOU CAN DEPEND ON

Island Creek

Island Creek coals are ideal, too, for industrial steam production.

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IBM Plans Expansion

Manufacturing facilities will be built at Lexington, Ky.; a laboratory at Kingston, N. Y.

INTERNATIONAL Business Machines Corp., New York, is launching two more major projects in its nationwide expansion program. Additional manufacturing facilities will be built at Lexington, Ky., for the Electric Typewriter Division. A laboratory for the Military Products Division will go in at Kingston, N. Y.

The Lexington operation will augment production at Kingston which got under way last month. Most of the firm's typewriter manufacturing activities have been shifted from its Poughkeepsie, N. Y., plant to Kingston.

Defense Work—Construction of the 150,000 sq ft laboratory will begin this fall. This group will do research and development work on giant computers being produced for SAGE, the Air Force's continental air defense system.

The first SAGE computer is being shipped to McGuire Air Force Base in New Jersey. It puts all aircraft in a given area under surveillance. From data fed in from outlying districts, it can tell instantly whether a plane is friend or foe, its course and speed. The computer will help interceptor aircraft or missiles find the target.

IBM has opened its commercial data processing center at 310 S. Michigan Ave., Chicago. Purposes: To provide facilities where customers can test programs before receiving their machines; to serve as a training tool for customer personnel; and to provide machines for sales demonstrations.

GE To Build Plant in Florida

General Electric Co., Schenectady, N. Y., will build a plant 10 miles northwest of Gainesville, Fla., to house the headquarters and manufacturing facilities of its Communication Equipment Section. Cost: More than $4 million. The section now has its headquarters and some manufacturing facilities near Syracuse, N. Y. The majority of its production facilities are at plants in or near Utica, N. Y. The four major product categories are: Two-way mobile radio communication, microwave, power line carrier and terminal equipment.

The company also announced the opening of a new Atlantic district regional warehouse and sales office at 3198 Chestnut St., Philadelphia, for its Construction Materials Division.

Enters Hauling Equipment Field

Specialized Trailers Inc. has been organized at 7400 Laurel Canyon Blvd., North Hollywood, Calif. The firm, producer of hauling equipment, is a division of Fabricated Steel Service Inc.

Koppers Plans Research Center

Koppers Co. Inc., Pittsburgh, will establish a multimillion dollar research center at Monroeville, Pa. The company expects to triple the scope of its research program within the next ten years. The first unit will be a chemical laboratory.

F. J. Stokes Firm Renamed

F. J. Stokes Machine Co., Philadelphia, changed its name to F. J. Stokes Corp. The new name was selected because it is more in keeping with the broad range of the company's interests and the varied line of production and processing equipment it has developed.

Buys Advance Spring Corp.

Advance Spring Corp., Chicago, has been purchased by a group of businessmen headed by R. C. Mixter, Milwaukee, president; H. J. Keats, vice president and treasurer; and Walter S. Davis, secretary. Herbert A. Keats is general sales engineer; Roy Forsyth, works manager.

Ceco Steel Expanding

Ceco Steel Products Corp. is adding a third floor to its general office building in Chicago and air conditioning the entire structure as part of its $2-million nationwide expansion program. The firm plans to extend its manufacturing activity to include the casting of aluminum billets from pig and scrap. Billets are used in the firm's extrusion press department, which makes aluminum window bars. An addition to the main manufacturing plant is being built to house two casting furnaces.

Expands Powdered Metal Unit

Lux Clock Mfg. Co., Waterbury, Conn., is expanding its powdered metal parts manufacturing operations. It will make a wide variety of powdered metal parts for other original equipment makers. Lux is offering a complete service to users of these parts.

Scovill Mfg. Opens Branch

Scovill Mfg. Co., Waterbury, Conn., established a branch office at 13300 Watertown Plank Rd., Elm Grove, Wis. Robert A. Nielsen is branch sales supervisor at Milwaukee.

Fastcut Tool Co. Formed

Cutting tools formerly made by the Fastcut Division of Hilton Mfg. Co., Ferndale, Mich., are being manufactured by the newly organized Fastcut Tool Co., 7405 E Davison, Detroit 12, Mich. Earl W Bathey is president.

Will Build Plant in Illinois

Charles Bruning Co. Inc., Chicago, makers of engineering reproduction machines and materials, will build a plant in Mt. Prospect, Ill. It will more than double the size of the company's two plants which it will replace. The investment in land and buildings will be about $3-million.

J&L Places Furnace Contract

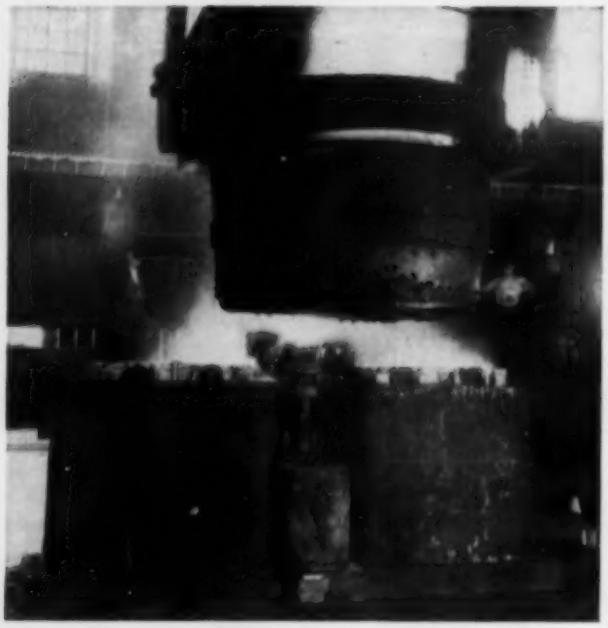
Jones & Laughlin Steel Corp., Pittsburgh, has awarded a contract to Gas Machinery Co., Cleveland, for a tube upset furnace for its Aliquippa Works Division, Aliquippa, Pa. It's a two zone, slot type.

J&L also has authorized an expenditure of about $2 million for further elimination of air pollution at its Pittsburgh Works. Of this, $1.5 million will be expended on the first step: Installing elec-

(Please turn to page 112)

step by step...
CLAYMONT BUILDS QUALITY INTO

Our customers have been telling us for years that Claymont Flanged and Dished Heads successfully meet every requirement for top quality. The reason behind such high performance is that we build quality into every head throughout every stage of production—from raw materials to finished product. Here's how:

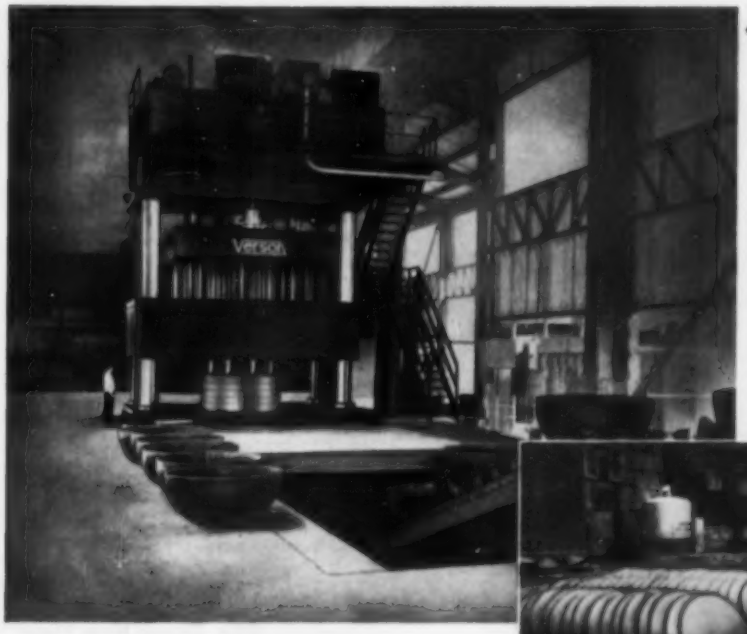


Because we make our own steel, we can carefully control its chemical and physical properties. Here, steel is being "bottom-poured". This means that the ingot mold is filled from the bottcm, thus assuring a more uniform steel.

After rolling the ingots into plate, steel circles are sheared to exact size and then heated in huge furnaces like this to the proper temperature for spinning.

This highly skilled craftsman is operating a big spinning machine which produces heads up to 19 feet in diameter. Every head he makes is subjected to careful inspections, both during and after forming.

ITS FLANGED AND DISHED HEADS



Claymont's head pressing facilities include this new 3000-ton giant, capable of hot or cold forming large diameter heads up to 10 feet. With this modern equipment, Claymont can press steel heads that will meet your most exacting specifications.

Stock Heads—You can be sure of quick delivery when you order from Claymont. That's because CF&I maintains large stocks of popular size heads, as well as many types of fittings for tanks and pressure vessels, at these warehouses: Los Angeles, Tulsa, Houston, New Orleans, Chicago, Buffalo and Claymont, Delaware.

and don't forget these other important members of the Claymont family...

- **Alloy Steel Plates**
- **Stainless-Clad Plates**
- **CF&I Lectro-Clad Nickel Plated Steel Plates**
- **Fabricated Steel Parts**
- **Large Diameter Welded Steel Pipe**

Like our heads, all Claymont products have quality built in—by just such painstaking controls and tests during every step of manufacture. For complete information on any Claymont product, contact our nearest sales office or write direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

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New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland (Ore.) • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CANADIAN REPRESENTATIVES AT: Edmonton • Calgary • Vancouver • Winnipeg • CF&I OFFICE IN CANADA: Toronto

A call to any one of our seven warehouses will get you speedy service on your order . . . whether it's for *alloy steel bars, billets or forgings,* in any size, shape or treatment you need.

All seven warehouses are located in principal industrial areas. Each is modern and well-stocked, and staffed by expert metallurgists.

Call now if you need our own HY-TEN steels — "the standard steels of tomorrow", or standard AISI or SAE grades.

Or write for *free* copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

In Canada: Sanderson-Newbould, Ltd., Montreal and Toronto

WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39, Massachusetts

(Concluded from page 109)

trostatic precipitators on furnaces in the open-hearth shop on the south side of the river. Results will be used as a guide for completing the installation. As another part of the project, a mechanical dust collector has been ordered for the coal pulverizing unit at the Eliza blast furnaces.

Tubemaker Changes Name

Stainless Welded Products Inc. Clifton, N. J., changed its name to Swepco Tube Corp. The firm specializes in the manufacture of large diameter, corrosion resistant pipe and tubing.

Speed-D-Burr To Build Plant

Speed-D-Burr Corp., Glendale, Calif., will build a $250,000 plant in Los Angeles. It will more than triple manufacturing facilities. The plant will have barrel finishing laboratories for experimental, customer service and planned research into barrel finishing problems.

Chambers Mfg. Opens New Plant

Chambers Mfg. Corp., Oxford, Miss., has opened its 100,000 sq ft, $1-million plant to manufacture gas and electric cooking equipment. Previously, the company's products were made at Shelbyville, Ind.

Wheland To Build Foundry

Wheland Co., Chattanooga, Tenn., plans to build a $3.5-million, fully mechanized foundry. Work will begin when financing arrangements are completed.

WaiMet Firm Changes Hands

Consolidated Foundries & Mfg. Corp., Chicago, acquired certain assets of WaiMet Engineering Co., Boston, and merged them with facilities of its Michigan-Standard Alloy Casting Co. The integrated operation will be carried on as WaiMet Alloys Co., a division of Consolidated. The division will centralize manufacturing, sales and research at 1999 Guoin St., Detroit 7, Mich. It will specialize in the production of master alloys

THIRD IN THE SERIES

Customer's Report

"Every charge is special—since we went Single Stack 100%!"

In the course of a conversation with a large steelmaker, he wrote this advertisement for us when he said — "I like this single stack annealing system. It enables us to give every charge preferential treatment. When we had the old four stacks, we used a couple of these single stack furnaces for those special orders that required higher quality anneal, or had to be delivered in a rush. Now, with all single stacks, *every order is a special order with us*, and with the return of stronger competition, I think it will pay off big."

It's been proven time and time again. The single stack will do a better job, faster. This means closer annealing control, important in modern metals — and better customer service, fewer dollars tied up in process inventory. The advantage is all with the single stack. And it's important to remember, too, Lee Wilson developed and designed more than 95% of the single stack equipment in operation today.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS

Lee Wilson* **ENGINEERING COMPANY, INC.**

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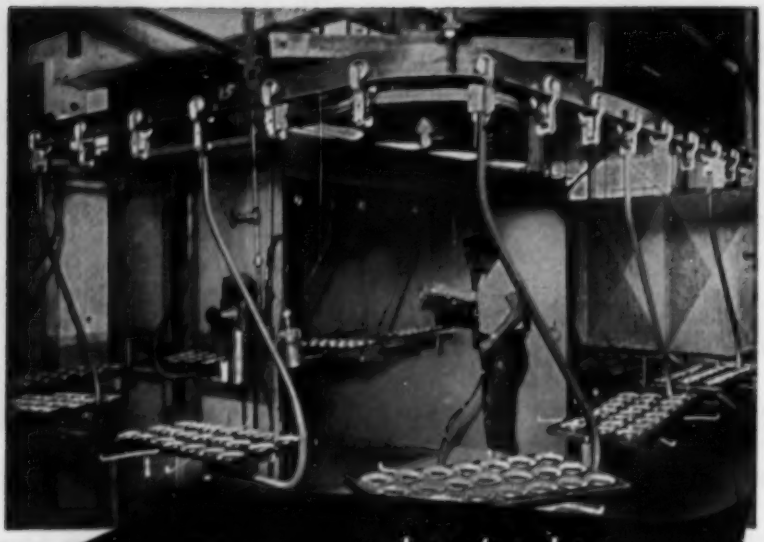
SINGLE-STACK RADIANT TUBE ANNEALING FURNACES

MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES

20045

The trend is to single stack. One of the nation's largest annealing departments recently put into operation 24 Lee Wilson Single Stack Furnaces and 72 bases.



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OVERHEAD CABLE
CONVEYORS
give you
GREATER SAVINGS!

LOWER INITIAL COST — Buschman "Universal" Cable Conveyors not only cost less but also outperform heavier, more expensive conveyors for light and medium-weight applications.

LOWEST MAINTENANCE COST — Constant take-up readjustment is eliminated because of a safety factor of 14-to-1 or greater.

LOWEST REARRANGEMENT COST — Exclusive Buschman design plus lightweight all-bolted construction make future changes fast and easy.

MORE COMPACT DESIGN — Shorter radius curves and dips permit more complete utilization of production and storage space . . . both overhead and at work level . . . require less room inside industrial ovens, washers, dip tanks, etc.

SMOOTHER OPERATION — There are no pulsations or jerks to damage delicate parts or finishes when your product is handled on Buschman Cable Conveyors.

PRE-ENGINEERED — Using Buschman standard stocked parts, your own crew can set up a "Universal" Cable Conveyor tailored to your specific requirements.

Write today for catalog.

PRODUCE MORE FOR LESS with Buschman Conveyors

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Complete Conveyor Systems For All Types of Industries • Engineered • Manufactured • Installed

for the precision foundry industries. Roger F. Waindle is president and general manager of Wai-Met Alloys Co.

Square D To Build in South

Square D Co., Detroit, will build an electrical equipment assembly plant on Marietta boulevard, Atlanta. The base of expanded operations in the Southeast, it involves an investment of $500,000.

Plans Steel Fabricating Plant

Standard Iron & Engineering Works Ltd. plans to build a structural steel fabricating plant in Edmonton, Alta. Estimated cost: More than $1.5 million.

REPRESENTATIVES

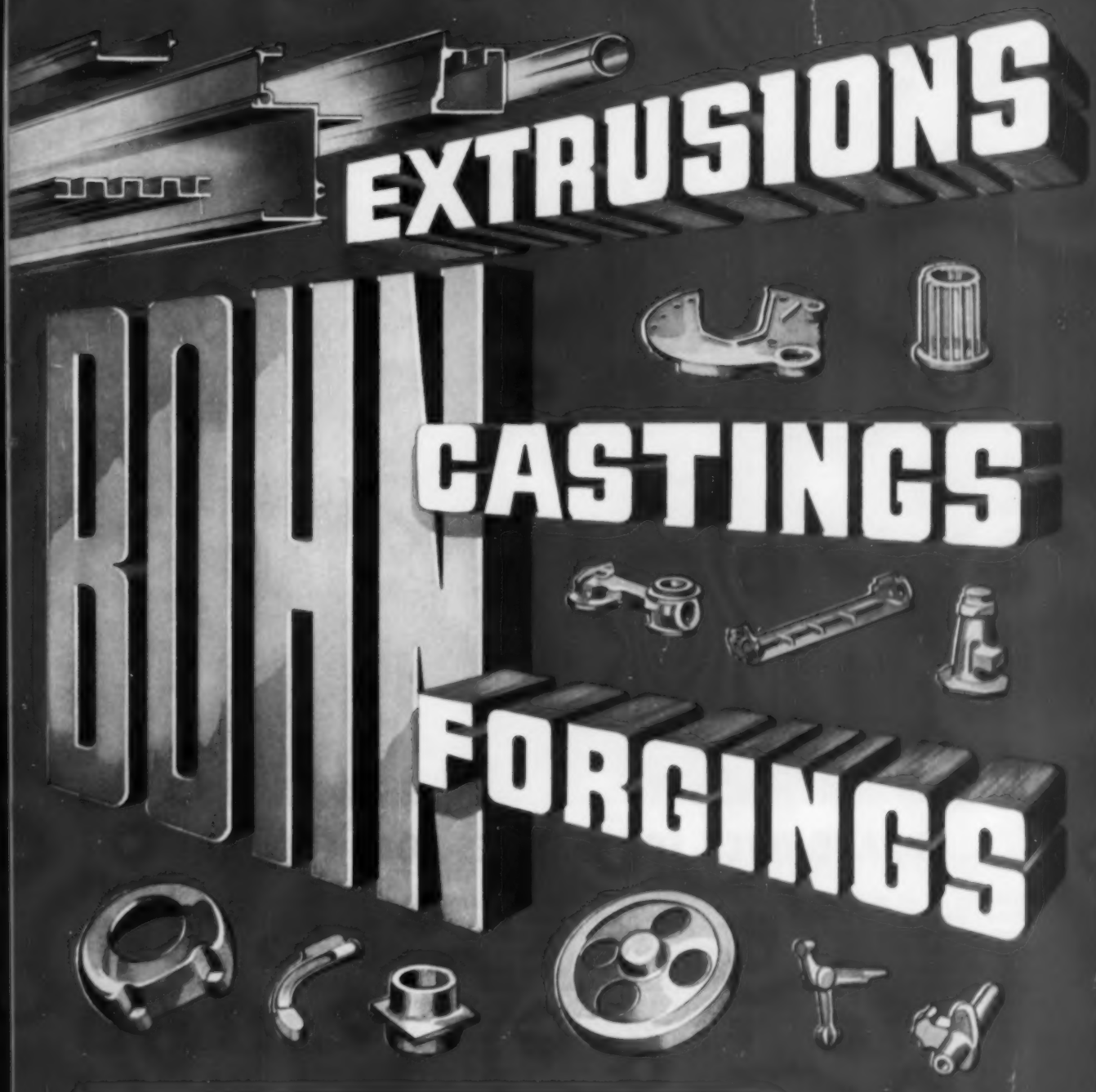
Hill-Chase Steel Co., Baltimore, distributor of steel and aluminum, was appointed a stocking distributor of cold-finished, turned and ground bars produced by **Cumberland Steel Co.**, Cumberland, Md.

Reynolds Metals Co., Louisville, appointed United States Aluminum Co., South Bend, Ind., a distributor of its architectural aluminum products. Reynolds also appointed Joseph T. Ryerson & Son Inc., Chicago, distributor of its aluminum throughout the areas served by Ryerson's Chicago and Milwaukee plants. James B. Carter is sales manager for the aluminum department at Chicago.

Scully-Jones & Co., Chicago, manufacturer of precision holding tools, appointed Nelson & Storm Tool Supply Co., Rockford, Ill., and Couch & Heyle Inc., Peoria, Ill., as distributors in their areas.

Robert R. Stough was appointed sales engineer for **Precision Metalsmiths Inc.**, Cleveland, maker of ferrous and nonferrous investment castings.

Alco Products Inc., Schenectady, N. Y., appointed Gibney-Decot Corp., Buffalo, as its representative in New York and the northern counties of Pennsylvania. Alco Products Inc. specializes in seam-



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For more than forty years manufacturers in every industry have availed themselves of Bohn's technical skill and fabrication know-how. The benefits of Bohn's wide experience in extrusions, castings and forgings and other fabricated products are available to you. Let us quote on your specifications. Send us your blueprints today!

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DRAVO DOCK FOR MATHIES COAL COMPANY

Growing use of water transportation along coastal and inland river areas has created a need for additional harbor facilities.

Speed of construction, long life, low cost maintenance and flexibility are advantages of the cellular type dock, illustrated by this typical installation at Mathies Coal Company's mine on the Monongahela River. Each cell, or cylinder, is constructed of interlocking steel sheet piling; when completed, it is filled with material such as sand and gravel and capped with concrete. Height of cells is determined by anticipated maximum water levels of the locality.

A dock can consist of one or two cells or as many as necessary to provide safe docking for floating equipment. This versatile method is particularly adaptable to use by mines, power plants, oil companies, manufacturing plants and for any industry with river or harbor depots for handling bulk or liquid cargo.

This is just one of the many ways in which Dravo Corporation has been serving business and industry in various fields of engineering activity for over 60 years. Dravo considers customer satisfaction an essential factor in all its products and services. DRAVO CORPORATION, PITTSBURGH, PA.

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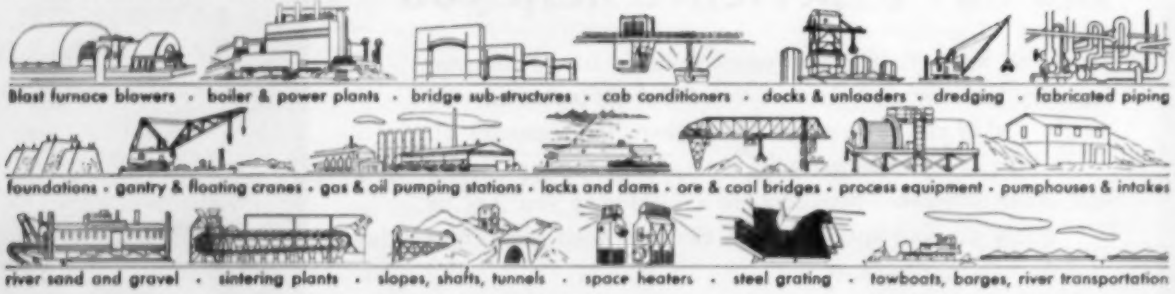
CORPORATION


Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping
foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes
river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

less and rolled forged rings and opened press and hammered forgings. Its Forge Division, Latrobe, Pa., is in the process of a $7-million expansion program.

NEW ADDRESSES

Advertising department of **Electro Metallurgical Co.**, a division of Union Carbide & Carbon Corp., moved to room 2840, 420 Lexington Ave., New York 17, N. Y.

United States Air Conditioning Corp. moved its main offices and plant from Minneapolis to 7900 Tabor Rd., Philadelphia 11, Pa.

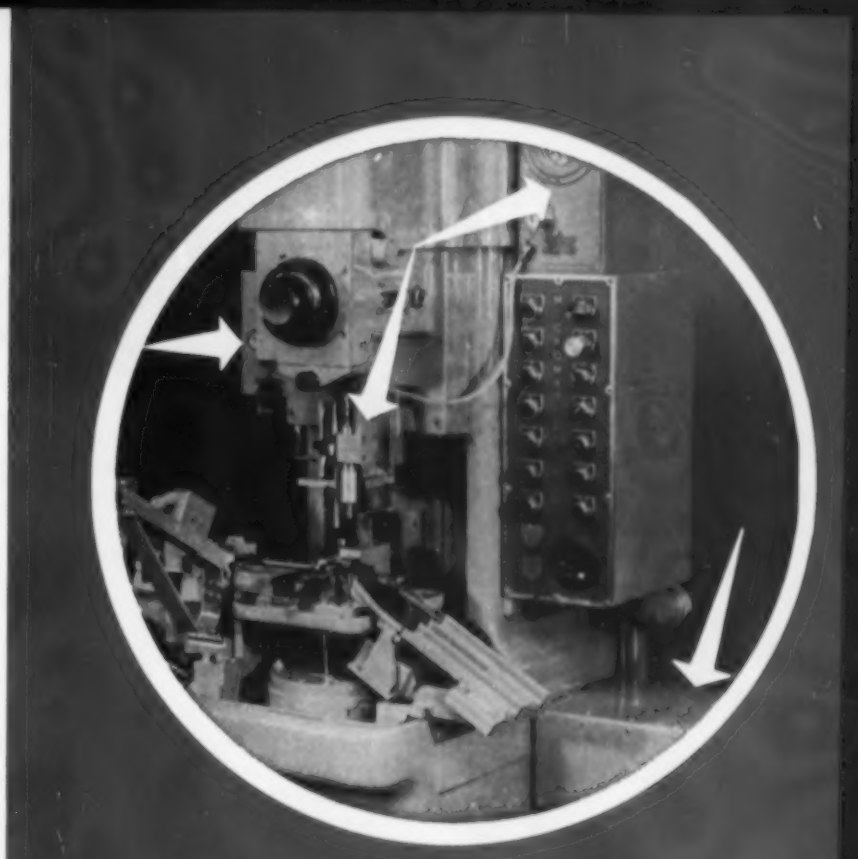
ASSOCIATIONS

The **Metal Powder Association** appointed Kempton H. Roll as the association's first full-time executive secretary and treasurer. Its new offices are at 130 W. 42nd St., New York 36, N. Y.

William F. Ryan, Stone & Webster Engineering Corp., Boston, has been nominated to serve as the 1956-57 president of **American Society of Mechanical Engineers**, New York. He will be installed in November after a letter ballot of the organization's members.

John C. Koch was elected president of **Fluid Controls Institute Inc.**, Philadelphia. Mr. Koch is vice president and general manager of Conoflow Corp., Philadelphia, a subsidiary of Walworth Co. and a leading manufacturer of final control elements for the process industries.

Charles M. Squarcy was elected president of the **Blast Furnace & Coke Association** of the Chicago district. Mr. Squarcy is superintendent of blast furnaces at Inland Steel Co.'s Indiana Harbor (Ind.) Works. Other officers are: Vice president, C. W. Bruce, Republic Steel Corp.'s South Chicago Works; secretary-treasurer, H. R. Nicklaus, Interlake Iron Corp.'s South Chicago Works. Outgoing president was G. A. Fort, U. S. Steel Corp.'s Gary Works.



MICROMATIC HONE

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TIME OUT FOR ADJUSTING

thanks to PRATT & WHITNEY

Automation Gaging

Producing precision parts — dependably held to close tolerances — on this Micromatic "Microhoner" is merely a matter of starting the machine and keeping the feed magazine filled. There are no time-outs for adjusting . . . to gage parts, to find that they're out of tolerance, and to re-set the machine. Production is continuous, output is increased, reject losses are way down.

This is the result of teaming a fine machine with Pratt & Whitney Automation Gaging. It's positive proof that "automation" is a right-now, profit-building reality . . . NOT a something-for-tomorrow dream. It's proof that the best way for *you* to get automation working in your plant is by writing TODAY to Pratt & Whitney's Automation Gaging Engineers outlining your needs.

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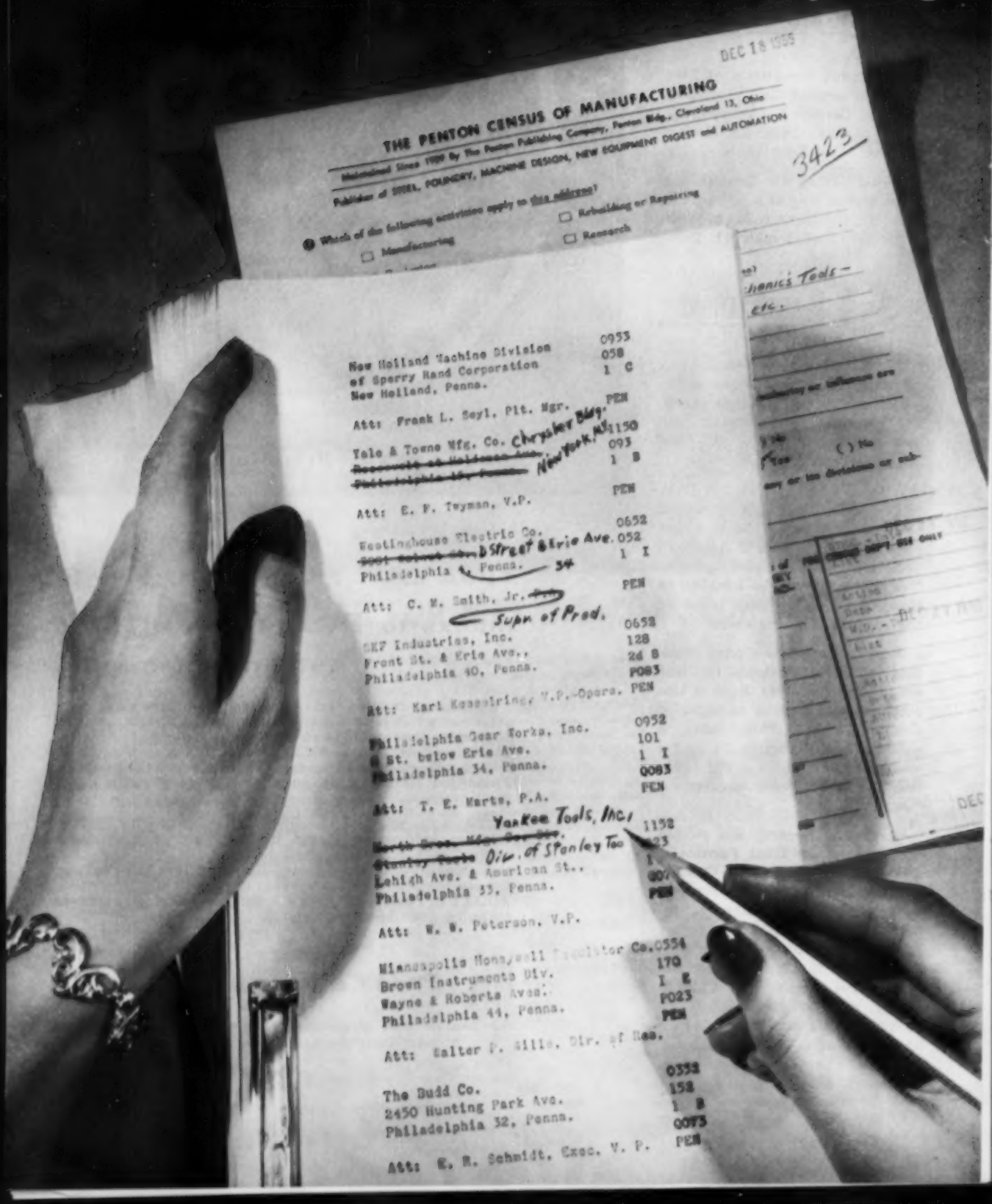
MACHINE TOOLS GAGES CUTTING TOOLS

What's the basic benefit you get



from Penton's million dollar census ?

Our million dollar investment in the Penton Continuing Census is paying *you* big dividends.

How? This is a *Continuing* Census. For 16 years it has been combing the market daily for new plants. It is continuously catching the changes—checking on personnel turnover, product diversification and plant expansion throughout this changing market.

All of this gathering of information doesn't help you one iota. It's the way we *use* it that counts.

You may assume your basic benefit from this million dollar census operation is the market research information you get—but that's *not* it. Important and helpful as such data is to so many of our advertisers—that's only a by-product of our census.

What is the basic benefit you get from Penton's Continuing Census? It is *constantly effective coverage* of your markets. We're using our up-to-the-minute census findings constantly to be sure we're reaching the right men in the right plants.

That's what you want. That's what you get from each Penton publication to make your advertising more effective.

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PENTON BUILDING • CLEVELAND 13, OHIO

Helping to "PAINT" your TV picture

WALLINGFORD

Stainless Steel Strip

This electron gun generates the pencil-like electron beam, or "paint brush," which sweeps across the fluorescent face of your television tube to "paint" the picture.

Vital elements of this gun are formed from ***Wallingford Stainless Steel Strip*** *held to extremely close tolerances to provide the uniform electrical characteristics that assure efficient, dependable performance.*

We offer this "television commercial" as one evidence of Wallingford's ability to meet YOUR most rigid specifications, whatever your design or manufacturing requirements. Visit our office and plant for even more positive proof.

THE WALLINGFORD STEEL CO.

WALLINGFORD, CONN., U.S.A.

SUPER METALS

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP

STAINLESS WELDED TUBES AND PIPE

6

STEEL's 1956 Management Series . . .

The editors of STEEL herewith present the sixth in their ten-part series, Program for Management for 1956. The complete list:

1. **It's Time To Grow** (Feb. 13, p. 81)
2. **Know Your Costs** (Mar. 19, p. 83)
3. **Ideas for Industry** (Apr. 23, p. 105)
4. **Metalworking Goes to Market** (May 14, p. 107)
5. **Metalworking's New Horizons** (June 18, p. 137)
6. **How to Live with SUB (Supplemental Unemployment Benefits)** (July 16, p. 121)
7. **To Merge or Not To Merge** (Aug. 13)
8. **Motivating Men To Produce** (Sept. 24)
9. **Automation—Bogeyman or Bonanza?** (Oct. 15)
10. **Industry and College—Partners in Development** (Nov. 12)

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

How To Live with SUB

HERE is a program that capitalizes on organized labor's drive for income security. You will be interested in it even if your company never faces a demand for SUB. For if the layoff plan never spreads to more than one of every eight hourly workers, you will still be forced to match its terms to compete on the labor market.

Labor wants steady jobs. Management wants steady production. Both seek a common goal. The difference is one of approach.

General Electric Co. says: "Steady production and steady jobs are the most profitable way for us to operate. You have the least capital tied up in facilities, the lowest material costs and the best vendor relations. You minimize costs of rehiring, retraining and call-in. You make the steadiest and most rewarding technological progress. In short, it's good management to have production and jobs steady."

What can management do to implement its program?

• The economy can't be stabilized by one company. The job will require a thorough re-education in both industrial and consumer buying habits. It will take faster, freer exchange of information between industries.

• But one company can do a great deal to stabilize its own operations. The job requires a concentrated effort, directed by top management. Many of the techniques cost money. But savings gained from stable operations may outweigh those costs. There's another plus. Stabilize employment now, and you'll be able to discount any demand for SUB.

Stabilizing your business will

bring other benefits. It is the most effective answer to rallying cries like "technological unemployment." And management may well find that stability will be a prerequisite of automation. Here are economist Peter F. Drucker's ideas along this line:

Looking Ahead — "Automation, as an absolute first condition, requires the establishment of a fairly predictable, stable and expanding market." Why? When committed to automation, the sales department must sell what the machine makes. Production can't be adjusted to short-term business fluctuations.

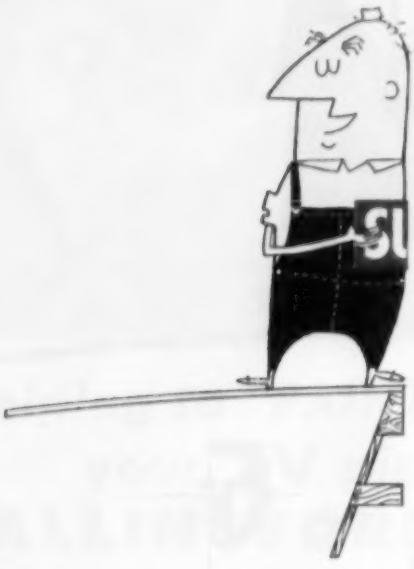
One company's experience with automation was cited at a Material Handling Society technical session last month. Said a vice president: "We have to run three shifts, five days a week. You can't speed this thing up or slow it."

Mr. Drucker agrees that automation will upgrade the labor force so that no man can be laid off without impairing the function of the production unit. Labor under automation, he adds, must be considered a capital resource and a fixed cost. Whether or not you go along with him, investment per worker is on the way up. The cost penalties of fluctuating production will grow more prohibitive by the year.

Statism?—Some will argue that we should guarantee markets by fiat. Washington could say to the Big Three auto makers: "The guaranteed minimum market for 1970 is 10 million cars. Ford and Chrysler can have 3 million apiece, GM will produce the other 4 million." That could result in a stable, but also a static economy.

The free enterprise approach is more complex, but it can lead to stability within the framework of an expanding economy. It can pay off a thousand-fold.

Your Program — How do you make a start? Here are some techniques that are being used successfully. They fall into marketing, manufacturing, purchasing and personnel classifications.



Labor Wants Stability

Says Walter P. Reuther: "The workers in our industries have waited many years to achieve their goal of guaranteed employment. They are prepared to wait no longer. They will not be fobbed off with arguments that the problem is complex and must be subjected to long study. The time for study is past. The time for action is here.

"Present SUB plans are just a start toward the income stability that we must have. We won't stop until we have a complete guaranteed employment plan. There are many weaknesses in the present SUB plans, just as there were in the pension plan, in health insurance and in every other union gain when it was first achieved. We are determined that we shall improve and build on this principle, until we have reached the full measure of security that all workers are entitled to. We have nailed down the principle that employers must accept responsibility for the economic loss from layoffs. From now on, management will share the responsibility for economic loss from layoffs.

"Benefits will spread far beyond the industries in which our members work. Guaranteed employment in autos will soon be followed by similar plans in other industries. In turn, supply plants will be able to provide greater security to their workers."

Marketing

Diversification is probably the first thing that comes to mind when stabilization is mentioned. It can be a good tool. Take a look at the situation among auto suppliers this year. Through the first four months, auto production fell 20 per cent below that of the same period last year. Yet many suppliers improved their records.

Bohn Aluminum & Brass Corp., Detroit, is one example. Its first quarter sales ran 13 per cent over those in the same period last year. The company notes that it is so diversified that only one-third of its business is in auto parts, compared with 60 per cent three years ago.

Tailor Made?—But diversification isn't a cure-all for stability problems. For a company with a single product line, it may be relatively simple to find a new product which can be made on existing equipment, by existing personnel and sold through existing channels to meet either seasonal or cyclical fluctuations. As you increase the number of product lines,

dovetailing of this sort becomes increasingly difficult.

Here's how diversification should work if it is to be any sort of answer to SUB demands. Replying to Mr. Reuther's recent request for a meeting to talk on production scheduling, R. S. Stevenson, president, Allis - Chalmers Mfg. Co., Milwaukee, said that though output of one farm tractor had been cut back 20 per cent, 100 workers had been kept on the job through transfer to other departments.

T. J. Ault, president and general manager of the Long Manufacturing and Detroit Gear Divisions, Borg-Warner Corp., Detroit, voices his ideas on the problem: "Diversification is only part of the answer. We can never hope to survive unless we produce new and better quality products at a competitive price in the auto industry or in any other market. We believe that auto manufacturers want our products and want the engineering brains we have to offer. We've spent more than $2 million on a modernization and development program, and we've doubled our engineering budget despite dim predictions for our industry."

Foundation—Sound product diversification programs take aggressive research to back them up. Armco Steel Corp., Middletown, O., offers a case in point. The company built its original laboratory in 1910, the first in the steel industry devoted entirely to research. Its modern successor houses 20 separate laboratories. The company's research division has ten more lab groups, specializing in stainless steel research, at the Baltimore plant.

The program has paid off. In large part because Armco hasn't put all its eggs in one basket, its operating rate has been higher than the industry average in almost every year since 1944. In 1954, the advantage was particularly marked. Armco's rate ran close to an ideal 90 per cent. The industry's barely broke 70 per cent.

Crystal Ball—You'll need good sales forecasts to help shape your production policies.

The National Industrial Conference Board, New York, suggests using a combination of these methods: 1. Jury of executive opinion—you combine and average the views of your top executives. 2. Sales force composite method—salesmen are asked to predict the outlook for their territories; predictions are consolidated. 3. Statistical—relate the sales of your product to some other measurable trend. Clark Controller Corp., Cleveland, for example, bases forecasts on equipment needs of various industries which are supplied by the National Electrical Manufacturers' Association, New York.

Manufacturing

The next step: Integrate production with your sales estimate. Here's how General Electric Co., Schenectady, N. Y., handles the integration of forecast and production for electronic tubes:

Where forecasts are reviewed monthly, points out the company, a high order rate for the preced-

Management Wants Stability

Says Mark W. Cresap, executive vice president, Westinghouse Electric Corp.: "Management and labor agree on the fundamental goals of the economy. Both want full employment and a rising standard of living."

Says W. A. Lacke, general manager of industrial relations, Continental Can Co.: "Stabilizing employment as much as possible is desirable even if SUB is not a factor. The addition of SUB makes it imperative that we take action to reduce the number of employees who are laid off due to lack of work."

Continental Can stabilized operations at one plant. Benefits, says Mr. Lacke, included decreased overtime cost, more efficient use of labor and skills, a possible decrease in unemployment insurance costs, increased employee morale and increased profit.

Says Robert C. Hendon, vice president-operations, Railway Express Agency Inc.: "While the automotive program (SUB) may not be transferred unchanged to other industries, it will have its effect on all. It will cause management everywhere to redouble its efforts to regularize employment, if for no other reason than self-defense. Smart management everywhere is taking stock of the situation right now."

ing month often results in an increased forecast and accelerated production schedules. Conversely, the forecast is reduced and production plans curtailed if the previous month's orders were lower than anticipated. Result: Manufacturing may be forced to expedite labor, materials and facilities one month, only to find its efforts nullified by the succeeding month's reduced order rate. Trained workers may be transferred or laid off one month and desperately needed the next.

Control—GE developed a statistical control system which is 99 per cent reliable, and simple enough to be run by clerical personnel. With it, the company spots either high or low forecasts quickly, and as a bonus, indicates the best inventory levels to carry. GE believes that its system should be equally applicable to controlling the production of industrial equipment and other products where demand is shaped by random factors.

Sell Know-How—If the manufacture of your regular products involves special know-how or machinery, you can often use it to get profitable fill-in work from other companies. Many clock and business machine makers, for example, have pulled useful orders into their plants by handling powder metal development and production for other metalworking firms.

Manufacturing for inventory is another commonly accepted technique for stabilizing production. Even companies that produce against firm orders often can inventory standard components. Potential losses from laying off help during short-term sales fluctuations can easily outweigh potential losses from temporary inventory accumulation.

One instrument maker redesigned his product so that the interior parts could be produced to stock. He was able to satisfy his customers' demands for style changes by making the housings to their specifications.

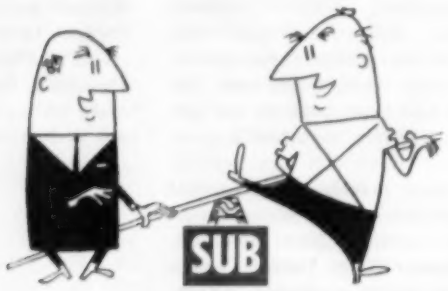
It's good management to acquaint dealers and distributors with your production scheduling problems. You may be able to get them to spread their orders more evenly. One selling point: You will be able to pass some of the savings along to them in the form of lower prices.

Cost Angle—How can you compare relative costs of any stabilization program? Linear programming, suggests R. O. Ferguson, vice president, Methods Engineering Council, a Pittsburgh management consultant, is one good tool. "A typical problem," he says, "would read like this: Determine the most economical program to satisfy fluctuating sales demand using relatively fixed plant capacity and employment, taking into account inventory accumulation and the option to make or buy.

"The results would give management the data to compare the costs of maintaining various levels of production and employment

Foundry Uses Multiple Approach

You can't build successful stabilization programs around one technique, however good. Top management must direct the efforts of all levels of the organization toward the goal. Basic is the handling of industrial relations.



Get Everyone in the Act

Morris Bean Co., Yellow Springs, O., a 500-employee precision foundry, believes that stable employment is a must. Explains Bruce McPhaden, plant manager: "Manpower is our most important asset. Our reputation as a high quality jobbing foundry depends on our ability to keep and develop the skills of our workers.

"Our organization was built with the aim of stabilization in mind. Like most foundries and other component suppliers, we have relatively little control over our markets. We use a transfer system to take the teeth out of the temporary peaks and valleys that result."

The company has two plants in neighboring cities, one making aluminum and the other ductile iron castings. Peak loads which move through the departments of each plant are handled by shifting employees between departments and between plants when necessary. If the transfer system can't handle the problem, the company relies on overtime.

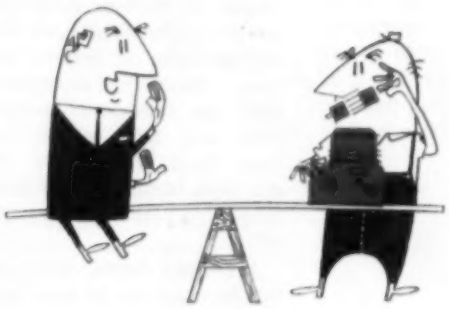
Job classifications are set up so that comparable jobs pay comparable rates in both plants. Each day, Mr. McPhaden has his foremen furnish a list of men who will be available for work in other departments. At the minimum, he figures that transfers give him an effective 5 per cent increase in personnel.

Notes Mr. McPhaden: "It takes good communications as well as an equitable wage structure to convince employees that a transfer system is in their best interests. I meet once a day with the general supervisors, who, in turn, brief foremen once a week. Foremen have weekly departmental meetings, making a point of bringing the men up to date on the business outlook and what it will mean to them. Each employee gets our annual report. Foremen and supervisors get the monthly report."

What happens when Morris Bean lays off? Last year, a

big governmental contract ran out. Workers were told three months in advance that some of them would have to be let go. Layoffs were made on a strict seniority basis. In addition to three months' notice, affected workers were given two days with pay to find new jobs. The personnel department put a lot of time into helping them get placed.

Idealistic? Says Mr. McPhaden: "It wasn't altruism, it was good management. Almost every man moved right into a new job. Our added costs for unemployment compensation were nil."



Get Product Balance

It takes unusual management qualities to go all out for stabilization. Sometimes, it may even mean turning business down.

Says Mr. McPhaden: "We do a good business in torque converter castings for heavy duty work—construction equipment and lift trucks, for example. But right now, we wouldn't take on a contract for a similar part from an auto company. Volume would be too high in proportion to our other lines, and our product mix would be thrown out of balance." The foundry supplies 90 per cent of all passenger car tire molds. This business often peaks during the heavy season for auto parts. Adds Mr. McPhaden: "When total business has grown so that an auto torque converter job wouldn't run more than perhaps 20 per cent of our volume, we'd be glad to take the contract."

Morris Bean believes that it's worth cash to have each employee identify his own prosperity with that of the company. It's paying 33 per cent of profits into its profit sharing plan. Of that, 15 per cent goes out as a cash bonus to employees every three months. The other 18 per cent is paid into individual retirement funds.

Personnel policy and planned product balance are the two fundamental tools this company uses in its stabilization attempts. It has others. Product leadership, based on high budgets for research, tooling and engineering, also plays a major part. Which mix best fits your problems?

with the costs of layoffs, rehiring, training, unemployment compensation and the like. Alternative plans can be worked out for several different sales forecasts to show how management can hedge against forecast errors and plan for minimum inventory risk in rising and falling markets."

Does stabilization pay off for manufacturers of a seasonal product? Here's what the operations manager of one of MEC's clients, a manufacturer of air conditioning equipment, has to say: "Some 60 per cent of our business is acutely seasonal. We used to manufacture in accordance with the seasonal sales demand. During the last year, we applied MEC's techniques and manufactured on a year-round basis. Our deviation from the average work load ran 1.4 per cent for the year. Profits were increased as production was stabilized."

During its application of the linear programming and inventory management techniques, the company reviewed product lines and manufacturing methods. Although it decided to produce some items year-round against seasonal sales, it was able to reduce annual cost of carrying inventories by $867,000 a year. Says the operations manager: "If this $867,000 represented profits on sales, the saving would be equal to an additional volume of $17.3 million."

Purchasing

Enlightened purchasing policies can do much to stabilize your operations and those of your suppliers. Suggests Industrial Relations Counselors Inc., New York: 'In most businesses, purchased items—raw materials, parts and services—are a large part of the final product. Unless they are produced economically, the company will suffer competitively."

IRC suggests these steps in purchasing for stabilization: 1. Release a purchasing schedule to your suppliers that covers the full period of your operating forecast. They can use this knowledge to intelligently plan their own production, employment and purchases. 2. Share product improvement and model change plans with suppliers, to give them advance notice of specification changes that will affect their scheduling. 3. Consider buying supplies by the year instead of by week or day by day. 4. Plan your capital equipment spending.

The disadvantages of replacing equipment during the periods of high prices, labor and material shortages should be obvious. But better planning in capital equipment spending calls for unusual courage and imagination during periods of repressed business and for unusual restraint when business is booming.

Needed: Decision—Machine tool and other capital goods makers point out that this area is one where governmental programs are less enlightened than might be de-

Diversification That Works

How do you smooth seasonal business cycles? Charles William Doepke Mfg. Co., Rossmoyne, O., thinks it has the answer. It has added industrial tote boxes to its line of toys. The products are made on the same equipment; personnel can be switched from one to the other as needed.

"We've got so much flexibility," says William C. Portman, industrial sales manager, "that we can even switch to Nestiers during the short time it takes to retool our line for a new toy."

Doepke had to build a new sales organization to handle the tote boxes. But the headaches have been worthwhile. The company is bidding on big league material handling jobs. One example: It has developed a modification of its basic unit for the Oldsmobile engine plant at Lansing, Mich., which eliminates rehandling of incoming components, in addition freeing floor space for production machinery.

Says Mr. Portman: "We're aiming for a 50:50 split dollar-wise between the two product lines. They're complementary not only because we can make them on the same machines, but because of the quick (60 day) cash turnover we get on the tote boxes. We have to carry toy inventories as long as six months."

To further improve its seasonal fluctuations, Doepke carries on a drive to re-educate both its toy distributors and its customers. Says Fred Doepke: "Heavy toy sales at Christmas are an artificial selling pattern which dealers have created by not using year-round displays and advertising. Vacation time, when children have all day long to play, offers a more natural and sustained selling period."

Doepke led the toy industry in summer promotion. It gives freight allowances to dealers to stimulate off-season sales. The Yardbird, an outdoor motorized train, is specifically designed to sell during the summer season.

While trains roll through final assembly, tote boxes come off the painting line

sired. One good way to plan capital equipment purchases is to take advantage of leasing arrangements. The industry promoted these plans vigorously until about a year ago, but they've been on the wane because of restrictive tax decisions by the Internal Revenue Service.

Metalworking's own long-term capital spending plans (for example, the current steel and automotive expansions) are having a big influence on over-all stabilization. Many businessmen feared that the inventory recessions of 1951 and 1954 might turn into long, hard downswings. Neither did. Few businesses cut back their long-term plans. Fewer cut them off.

Inventory Angle—More purchasing foresight could also be used to good effect to smooth the peaks and valleys in basic steel, whose operations have wider fluctuations than those of the economy. There's good reason for some new efforts. U. S. Steel's 1955 annual report said: "If customers had been able to utilize idle steel mill capacity during 1954, there would have been no steel shortage this year." There's more to it than the question of supply. If mills could schedule operations at their most efficient level, costs would be lower and the industry would be able to take a complete new look at its pricing structure.

Suggests James H. Robins, president, American Pulley Co., Philadelphia: "Inventory management policies can and should be improved. The beginning of a business upswing finds inventories generally low. Rising bookings uncover inventory shortages, lengthen deliveries, and force buyers to order ahead and even to place multiple orders. The resulting big increase in bookings creates an illusion that business is better than actual end use really is.

"Planning, even production planning, is revised in the light of over-optimistic estimates of business strength. When the downswing comes, inventories are inevitably cut back too far."

One Answer—While Mr. Robins feels that competition makes it hard to regulate upward business swings, he believes that concerted

action during a downslide would do much to take the teeth out of the inventory cycle. "You know what your normal business level is," he points out. "When orders drop off, inventory cutbacks come. Why not stop inventory reduction when you have reached a level which will support your normal business? Financing such an inventory policy over a short slump is much less expensive than cutting back all the way with its layoff, rehire and other short-operation expenses."

Personnel

However perfectly a stabilization program may be tailored at the marketing, manufacturing or purchasing levels, its ultimate success will depend on the wholehearted support of the workers. SUB demands are on the table today because workers don't believe that management has more than a passing interest in their job security.

Partners—A sound industrial relations program is basic. Says Saul M. Silverstein, president, Rogers Corp., Rogers, Conn.: "Every enterprise has at least four partners—the owner, the customer, the supplier and the worker. Management's responsibility is to see that all four are treated equitably and made to understand their dependence on each other."

What sort of changes must be made at the personnel level? For the foreman, stabilized production and employment mean new dimensions. He will have to think of each new man as a permanent member of the family. He will not be able to rely solely on personnel departments to select his new men. Probationary periods will be for real.

The foreman will have to develop a highly skilled and versatile work force. Management will have to train him. Jobs will have to be grouped carefully.

New Terms — The American Management Association, New York, lists these as contract essentials if management hopes to regularize employment and stay in business:

The right to shift employees from one area or department to another, at least on a temporary basis, without following rigid seniority rules.

The right to move employees from one location to another to meet production requirements.

The right to use production or operating employees on deferred maintenance jobs during slack periods.

The right to shorten the work week without incurring layoff penalties.

The right to stagger work weeks over six and seven day operations without penalty pay.

The right to spread vacations so they tie in with slack periods.

The right to consolidate work and departments and to transfer work from one department to another when efficiency dictates.

Other implications of stabilization are as important. Discipline on the job must be tightened up. Soldiering, malingering, chronic absenteeism and similar inefficiencies must go.

Conclusions

Stabilization presents one of the biggest challenges that metal-

Help Customers Pay Bills

Tailored financing can help you to stabilize production and to simplify your inventory problems.

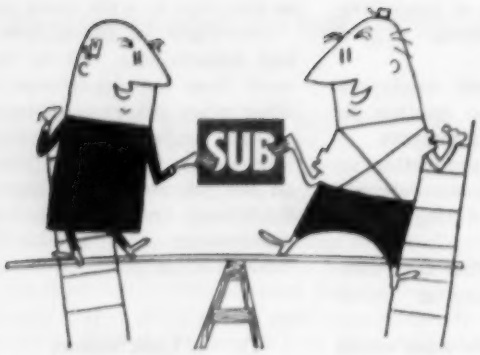
Organizations like C.I.T. Corp., New York industrial financing house, give a lot of help to companies with seasonal sales patterns.

Teaser— An example: Soft drink sales hit a hot month peak, and slide badly in winter. Result: Makers of soft drink dispensing machines have an acute seasonal sales problem.

Here's how C.I.T. helped a typical manufacturer. It set up a graduated payment plan for the company's customers, which gears their payments on the machines to rise and fall with their established income pattern. They can skip payments without penalty during the winter months, taking up again when summer boosts their income.

In 1952, when this payment plan was developed, the manufacturer's sales were about $6 million. Since then, off-season business has risen fast. Last year, volume topped the $9 million mark.

You, Too— Similar plans are worked out by C.I.T. Corp. to fit the needs of many industries. Construction equipment sales, for example, tend to fade in the winter months. With installment plans featuring skip payments and payments geared to income, contractors gain from going ahead with equipment purchases during fall and winter. They can get some work out during the off months, but don't pay until the steady jobs come in with spring.



Steps to Stabilization

Top management must initiate, co-ordinate and follow through on the program:

Through Marketing

- Sell existing products to different seasonal markets
- Time new model or product to smooth seasonal demand
- Advertise to boost off-season demand
- Use price concessions to influence seasonal consumer demand
- Encourage distributors to spread their orders
- Lease, rather than sell your product

Through Manufacturing

- Produce end products or components for inventory
- Subcontract to ease peak loads
- Get subcontract work to fill a gap
- Encourage vacations in slack periods
- Adjust the work week to production levels
- Set up "flying squads" to handle emergency loads

Through Purchasing

- Let suppliers know your long-term purchase schedules
- Plan specification changes as far ahead as possible
- Share sales forecasts and other stabilization data with suppliers
- Plan capital equipment spending on a long-term basis

Through Personnel

- Seek maximum freedom in transferring workers
- Use equitable wage systems for temporary transfers
- Hire versatile, rather than single-skill workers
- Train workers to improve their versatility
- Sell supervision on the stabilization program
- Avoid temporary hirings and layoffs
- Sell workers on the stabilization program

working has ever faced. It will take new co-operation among individual companies, among companies and unions and between company and worker. It offers a new opportunity for teamwork and imagination.

Goals—Stability may demand a complete rethinking of marketing techniques. Mr. Drucker suggests that appliance makers might stabilize both their own operations and those of their suppliers if they were to lease their output to the housewife instead of selling it. After five years, perhaps, they would call in the units and install new models. A second-hand appliance market would be logical.

Similar departures in marketing practices might help the auto industry and its suppliers. If makers could eliminate the annual model change, instead introducing new features as they are developed, violent fluctuations could be ironed out. Problems with the traditional sales slump at the end of a model cycle, when buyers wait for a completely new car before putting their hand in their pocket, should also disappear.

More—Or perhaps the industry might decide to stagger new model introductions line by line. Counting production of the Big Three only, such a practice would put more than one new car on the market every month, and spread the change-over slowdowns over the full year.

Management is also going to have to rethink inventory policies. Better tools must be developed to speed accurate information on inventory levels.

Opportunity — For their part, union leaders will have to give up some of their most cherished shibboleths—rigid seniority among them.

Sums up Harold J. Ruttenberg, onetime CIO economist, now president of the Stardrill-Keystone Co., Beaver Falls, Pa.: "America needs a system which will insure against the greatest single loss in national production: Instability. The annual wage truly presents management with the opportunity to reassume leadership in setting the pattern and pace of employee relations. We are not afraid of the annual wage; we want it."

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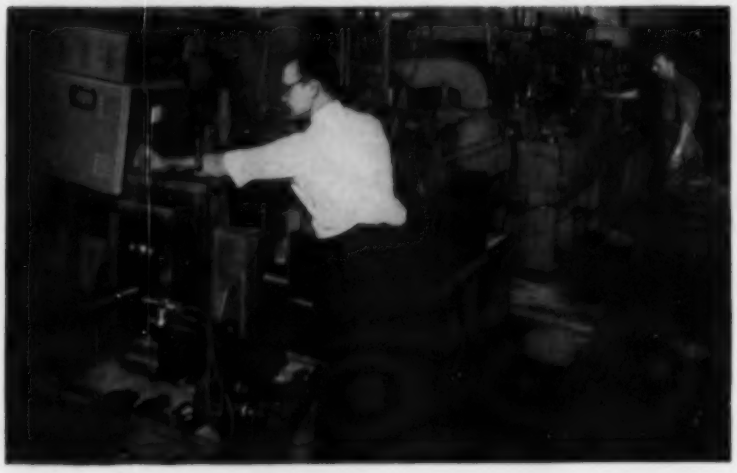
AUTOMATIC INSPECTION AND CONTROL ON CONTINUOUS PRODUCTION LINE



Continuous inspection of steel tubing and strip at production speeds is now an accomplished fact with the new Sperry Ultrasonic Reflectoscope® and RA attachment. This unit scans material traveling at high speeds and registers the presence of both internal and surface defects. Far more thorough than the human eye, it provides for both defect recording and signaling in addition to continuous inspection. Designed to incorporate signal lights or alarm bells, as well as automatic marking and machine cut-off units, the Sperry Reflectoscope and RA attachment is a flexible, accurate instrument which opens a new area to more effective cost-cutting quality control.

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Technical Outlook

IDEALIZED TESTING— A new life-test method lets you fly the airplane or run the automobile right in the laboratory. Developed by Baldwin-Lima-Hamilton Corp.'s F. G. Tatnall (Electronics and Instrumentation Division, Waltham, Mass.), here's how it works: Strain gages attached to operating parts store strain signals on tape or wire recorder which encompass variable frequency and amplitude and peak strains of short duration. The tape is played back in a testing machine to load test structures, parts, components or materials in a way equivalent to their use. Environmental conditions of hot, cold or corrosion can be simulated, using an enclosure for the test piece.

NO-FIRE FLUID— A new hydraulic fluid that will not burn on contact with flame or heated surfaces has been developed by Shell Oil Co. Formulated from water, petroleum hydraulic oil and emulsifying agents, the fluid is particularly suitable for industries where hydraulic leaks or line ruptures would be immediate fire or explosion hazards. It has been under test for some time at a large diecasting plant.

TRANSFORMER HEAT— A new heat conducting compound makes better and more economical television transformers possible. Produced by Foster Transformer Co., Cincinnati, the potting material conducts heat from the inner windings to the outer surface where it can be dissipated.

STRONGER MOLY— Production is under way at Climax Molybdenum Co., New York, on four new molybdenum-base alloys that have high structural strength above 1600°F. One contains 0.2 per cent Cb, another 0.5 per cent Ti, another 1.0 per cent V, the last 2.0 per cent W. The alloys can be fabricated on conventional tool steel mill equipment. Possible industrial uses: Electrodes and auxiliary equipment for glass-melting furnaces and piercing points used in making seamless tubing.

BUTCHER BLOCK FLOOR— Around the presses at GE's Appliance Park the floors are made of maple butcher blocks about 2 x 3 ft square. The blocks hold up under abuse, yet can be picked up and put down in a few minutes when the presses are moved.

FLAW DETECTIVE— A new ultrasonic transducer can locate tiny flaws closer to the surface of a test piece than its quartz counterpart, and can differentiate between two defects in the same minute area. With an aluminum specimen, it detected a round flaw 0.0017 sq in. in area which was 0.1-in. below the top surface. The transducer is made by Curtiss-Wright Corp., Caldwell, N. J.

AGAINST A BRICK WALL— Armco Steel Corp., Butler, Pa., had a problem: How to squeeze a blower into a compact recess in the cellar of a billet mill. Most blowers were too large. Vane axial blowers made by Joy Mfg. Co., Pittsburgh, were the solution (two 10 hp units were used). Vane axial fans, when installed in line with ventilation ducts parallel to and close by an overhead structure, may require 70 per cent less space than conventional centrifugal fans.

MICROWELD— Elgin National Watch Co., Elgin, Ill., sought a spotwelder small enough to handle assembly of its fingernail-sized Neomite relay. It was found—in a dental supply house.

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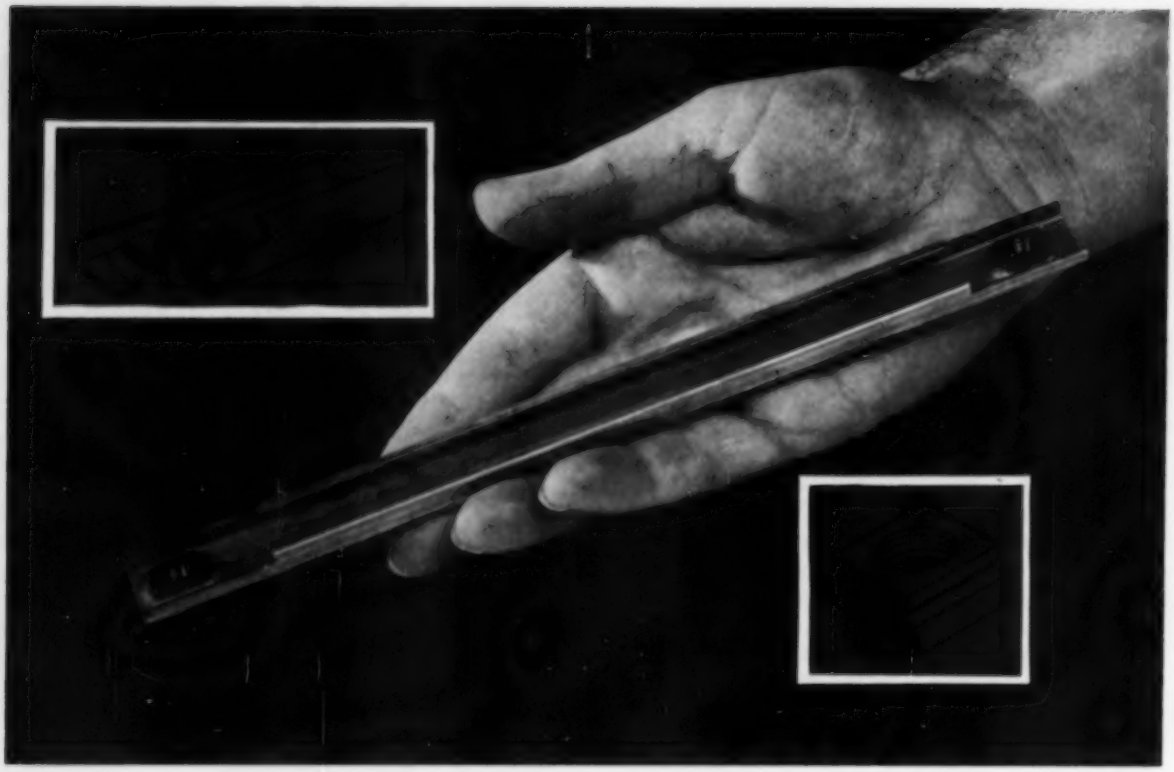


Save with Shaped Wire

Cold drawn special shapes conserve raw materials, reduce or eliminate machining, serve as preformed stock. Added advantages: Improved machinability, wear resistance

THE NUTS in the assembly above are made from a special shaped wire.

Savings came to 30 per cent (net).

Production increased 60 per cent.

One machine operation was eliminated.

The assembly (made by Kean Mfg. Co., Dearborn, Mich.) is part of the window regulating mechanism for a car. Used in a special press, the nuts pierce the channel and are staked in a single stroke. This is only one example of how shaped wire is saving dollars in a wide variety of metalworking industries.

Why—Shaped wire saves material, eliminates machining, forming, forging or similar operations. How much depends on the originality and cleverness of the designer. The end product may be nothing more than a slice from a shaped wire.

Besides simplifying production, a shaped wire is stronger (but less ductile) than hot-rolled stock. Cold drawing increases tensile strength, yield point and hardness in any grade of steel. Cold worked material has improved wear resistance, yet it is easier to machine.

Surface finish can be quite fine. One maker will provide a 7 or 8 microinch (rms) finish on request. A large number of parts require no finishing or final polishing. Gear teeth, for example, are smooth enough as drawn.

The cross section of a shaped wire is quite accurate. Variations are much less than those of castings, forgings and hot-rolled sections, and are representative of good machining practice. Extremely accurate contours, difficult with other methods, are a breeze for cold drawing.

Applications — Generally, a

shaped wire is used where space is at a premium, or to eliminate a variety of operations. It serves as a preshaped strip for presswork, or to fit a hole or mating part that isn't round.

The most widely used shape is flat—watch springs, egg beaters, needle valves, springs and thousands of flat specialties.

Where greater loading is required in a limited space, springs are made from a square or rectangular wire. A variety of tools (Allen and power varieties) use a special wire shape for the tool bit.

Sprag clutches use a special cam shape, cut to length and broached on each end.

Saver—Two big volume items are cam gears and ratchets. The user merely saws the shaped wire into lengths, drills a hole and broaches the splines on the inside diameter. Probably the windows in your automobile are raised and lowered with a pinion made from a shaped wire.

Well screens used to be made by sawing slots in tubes. They clogged quickly and became useless.

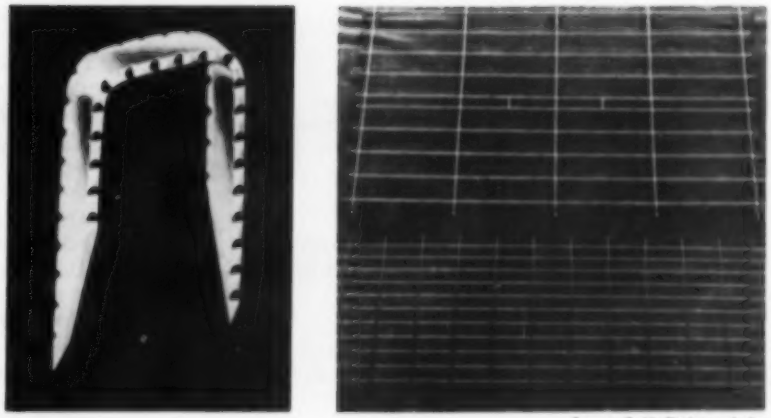
The Wedge-Wire Corp., Wellington, O., forms triangular, wedge and three other special shapes into a superscreen, which has superior nonclogging features. The same principles are applied to other screens for filtering, sizing or washing a wide variety of materials, including coal.

Imagination Pays Off

It's no longer necessary to drill and tap holes in castings. Heli-Coil Corp., Danbury, Conn., uses diamond or thread-shaped wire to make spirals that are inserted in the mold. When the casting cools, the inserts provide both the hole and the thread.

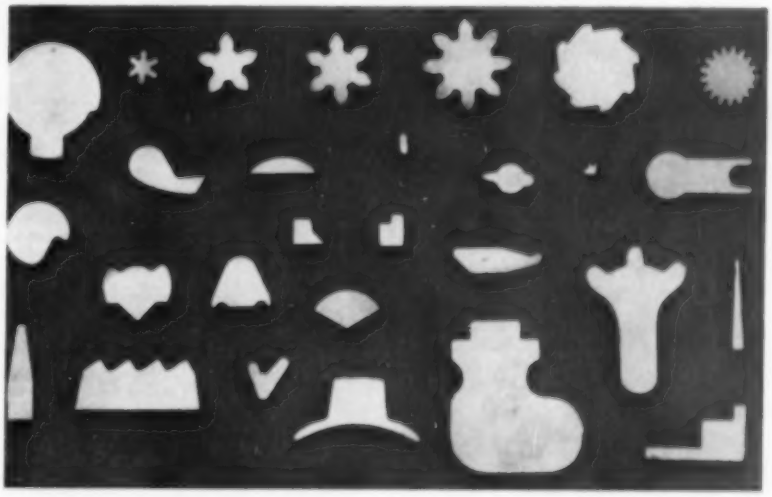
Many needle valves have square sides. From a round bar, it takes two operations: Turn the nose and mill or shape the sides. By using square, rectangular or even triangular shapes, only the nose needs turning. Saved: More than half the machining time.

Unusual—Inexpensive ball bearings for toys and furniture probably represent the most imaginative use of special shaped wire. Cut lengths are formed into circles

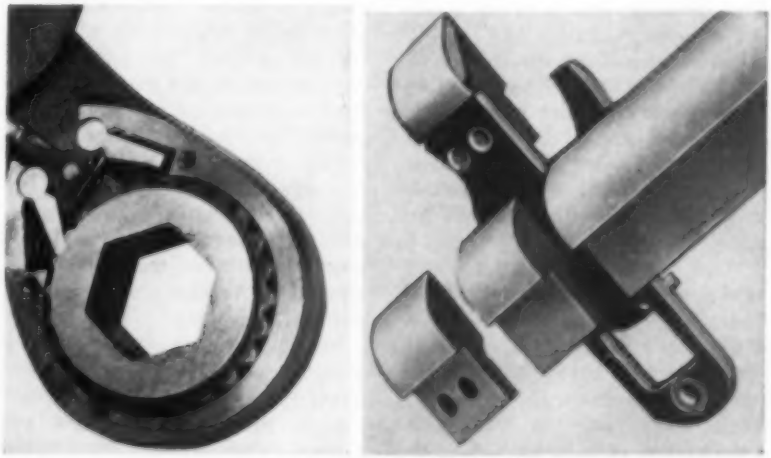


Source: E. H. Titchener & Co.

The barbs in the edge give this staple (left) a holding power superior to the ordinary kind. It's made from a flat wire with the barbs already rolled in. The maker says it's much cheaper than steel strip. Decorative wire grilles like those on the right can be made with combinations of round, flat, square or oval wire



Here are a few of the special shapes of wire and bars supplied by Republic Steel Corp., Cleveland. Some of these only need to be cut off to make a finished piece



Two examples of pieces by the slice. The ratchet pawls (left) and the door latch tongue are cut from special shapes

Standard Shapes

1. **Flat**—Toothbrush tuft holders, spiral feed in automatic pencils, saw blades, underwear, rake prongs, eyelash curlers, paper clips, retainer keys, washers, refrigerators, pants creasers, ball bearing separators
2. **Rectangle**—Shaft keys, springs, needle valves (also many of the items listed under flat)
3. **Square**—Dentists' wire, door knob shafts, shrapnel, cement nails, screw drivers, necktie and shoe racks, screw machine stock, springs, ornaments, cabinet locks, hardware
4. **Hexagon**—Screw machine stock, keys for windup toys, Allen wrenches, Zerk fittings, floor grating
5. **D-shape**—Wire cloth, filters, fruit juicer shafts, nut stock and appliances
6. **Half-round**—Cotter pins, furniture and appliance handles, special bolts, sliding bolts for doors, mixer and beater blades
7. **Oval**—Wrist watch bands, baby furniture, decorative grilles
8. **Half-Oval**—Pie pan separators, bobby pins, jewelry
9. **Triangle**—Self-cleaning well screens, needle valves
10. **Keystone**—Well screens, cloth filters, lock washers, springs

Special Shapes

1. Nut stock for nut strips
2. Decorative trim in refrigerators
3. Ball bearing races
4. Pawl for automobile emergency brake
5. Staple wire
6. Wood chisels
7. Annealed strip for blanking combination can and bottle opener for Scout knives
8. Weld nut stock
9. Automotive transmission parts
10. Wire for radio, TV tubes, light bulbs
11. Door knob shafts
12. Small cams
13. Special segment gear
14. Tire chains
15. Cam wire
16. Automobile control rod
17. Backup rings for welded joints
18. Eyeglass frames
19. Backup rings for welded joints (consumable)
20. Hose protective wire
21. Typewriter bars
22. Decorative strips, drawer handles
23. Bows for auto headliners
24. Auto engine valve keepers
25. Jaw stock for chucks
26. Rack for drawers
27. Blades of combination squares
28. Zipper teeth

for the inner and outer races. A slot in the side opposite the bearing face fits the sheet or plate that holds the bearing assembly. Butt flash welding and a grind could improve the quality of the race.

Presswork—Many special shapes are thin and flat. They are frequently confused with strip which is cut from sheet. Such wire can be made with one or both edges tapered or beveled. When annealed, it becomes strip stock for blanking.

Weld nuts are made from a rectangular shape with two ridges on one side. The wire is fed into a die which punches a hole, cuts it and flattens all ridges except those on the four corners—they are the projections used in projection welding the nuts to an assembly.

Lock washers are made from an oval or flat wire. Flat wire with scallops or grooves becomes drawer handles after forming and piercing.

By the Slice—It is possible to design a shape that requires no other work than cutoff to make the end product. The pawls for a ratchet wrench are sawed directly from a shaped wire. So are the pawls for the emergency brake handle on an auto.

A midwestern wiremaker is experimenting with hollow wire, drawing splines into the inside diameter, teeth on the outside diameter. (Another example of parts by the slice.)

Welding backup wire insures a smooth interior surface and reduces turbulence in the fluids carried in pipe. Several shapes are made. One is the consumable kind which will find increasing use in atomic reactor welding.

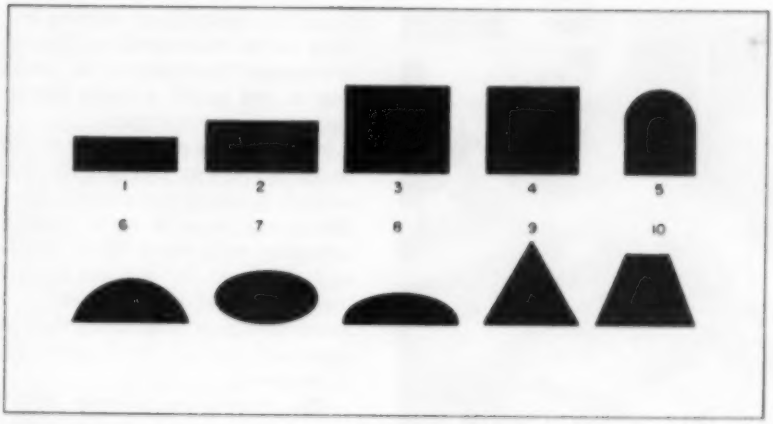
What Is It?

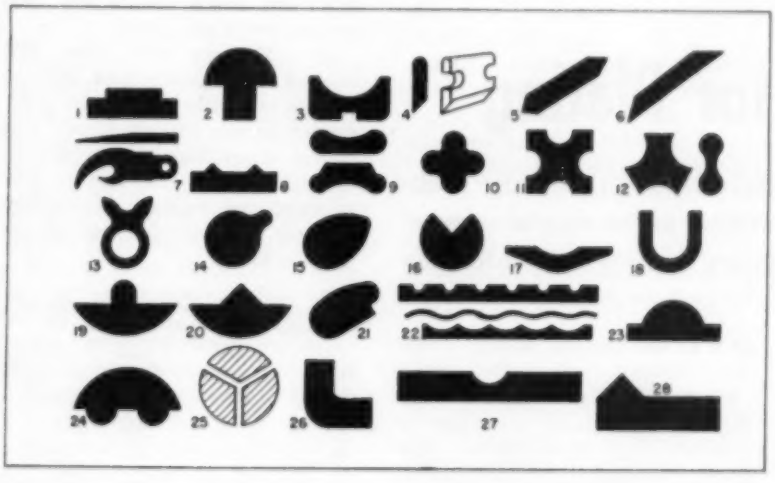
A wire is any cold worked filament, slender rod or bar of uniform cross section. Shaped wire has a cross section that isn't round.

It is usually limited to sizes less than 1 in. in diameter; some makers consider 2 in. as the upper limit. Special section bars are the big brothers in the shape family. Wire is furnished in coils; bars come in a variety of standard lengths.

Materials—Most common ferrous and nonferrous metals are available as shaped wire.

Cold work has different effects in each metal. Some alloys work harden slowly. Many stainless steels work harden rapidly. Some parts are annealed or heat treated as a final operation.





shape, the more it costs. The two most complicated listed by Republic, for example, require one to six hot shaping passes and five to ten cold passes.

Practical limits: Sections that are too thin and weak to be pulled through a die, and re-entrant or excessively sharp inside corners (limit 1/64-in.). Outside corners can be extremely sharp.

Look Around—Know-how is at a premium in the manufacture of shaped wire. Some makers use the drawbench exclusively to form bars; others use complicated, multipass wire forming equipment that keeps costs low for high quantities; still others depend on single stand equipment. A great many have dies, rolls and turksheads (four rolls in a cloverleaf arrangement).

In asking for help with a shape, it will pay you to check several sources.

The maker of shaped wire can help you cut production costs. But it really depends on your initiative, and the ingenuity and originality of the designer.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Manufacturing practices vary. One firm reduces its wire 20 to 22 per cent with each draw; another confines itself to as little as 10 per cent. Be sure to consider material, mill practice and the need for heat treatment.

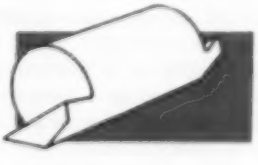
Stock—As a whole, the industry has roughly ten shapes that can be called standards. They are illustrated in the table on page 134. Raw material costs can be pared by sticking to one. A few special shapes (page 134) are stock items at some suppliers.

Special shapes are made in a bewildering variety. Republic Steel Corp., Cleveland, says that it has made more than 3000. Manufacturers use them for everything from jewelry to ball bearings.

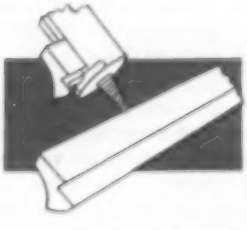
Limits and Know-How

Generally, the more intricate the

REDUCE a small part to its basic cross section and it probably can be made from a shaped wire. You can get surface finishes as fine as 7 or 8 microinches rms, hardnesses to Rockwell C50 (in steels) with greatly improved machinability.



The cam sprag (left) started as a shaped wire. Cut it to length and broach . . . it's finished



Blades for wood bits (right) start as a special shape, too

Selective plating builds up a worn shaft

More Jobs for Plating

How the process is solving some of today's toughest problems was a high spot on the program at the annual convention of the American Electroplaters' Society in Washington

HERE are some of the areas in which plating is coming to the rescue of industry:

A standard test measures the degree of leveling contributed by plating.

Brush plating builds up worn and mismachined areas.

Nickel-chromium coatings for the protection of molybdenum against high temperature oxidation are most promising.

A new bath for plating aluminum produces bright deposits.

Level Plating—Bright coatings that level are getting top attention from people who are looking for ways to cut finishing costs. Plating baths (such as nickel and copper) put down a deposit that is thicker in small recesses and thinner on small protrusions.

The result is a decrease in depth or height of small surface irregularities. Appearance is improved. Polishing and buffing costs are reduced.

To compare the leveling ability of different plating baths and to determine the effect of variables (current density, agitation and temperature), a quantitative method of measurement has been developed at the General Motors Technical Center.

Yardstick—Fig. 1 (below) shows a cross section of a roughness standard that evolved from this work. Referring to the sketch (Fig. 1), here's how GM's James D. Thomas said the method is used to determine the leveling ability of plating baths:

"If metal is deposited at an average thickness of 200 microinches, 215 microinches would possibly be obtained in the valleys and only 185 microinches on the peaks.

"The surface after plating would then have a peak-to-valley depth of 50 microinches—a reduction of 30 microinches. This reduction, converted to a percentage figure, can be used as a measure of leveling ability. For this illustration it's 37.5 per cent."

To compare the leveling ability of similar baths by this method, equivalent deposit thickness must be used, as well as identical surface roughness and surface contours of the unplated test specimens.

Another Way—Because surface roughness and geometry have an effect, Mr. Thomas suggested that it may be desirable to express leveling as the relationship of deposit thickness in the roots to the thickness at the peaks, without including specimen dimension.

In Fig. 1 this relationship would be 215 divided by 185 or 1.16. This method is useful particularly when the change in notch depth is small compared with the original depth, as is the case for notches several thousandths of an inch deep. A disadvantage is that more time is consumed because cross sectioning is necessary.

The results on leveling ability of seven proprietary bright nickel baths and one semibright bath (A) are given in Table I. Similar results for three proprietary acid copper baths are given.

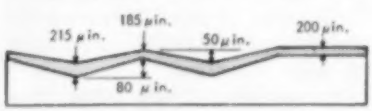
Mr. Thomas said that GM studies have shown that leveling results primarily from organic additives in the plating bath. The degree of leveling is controlled by operating conditions, such as temperature and current density and possibly by the thickness of the cathode film.

TABLE I
Comparison of Leveling in Plating Baths

Proprietary Bath	Nickel—0.001-In. Thick Roughness—Microinches Before Plating	After Plating	Per Cent Leveling
A	17	3.0	82
B	17	4.0	76
C	17	4.0	76
D	17	4.5	74
E	17	4.5	74
F	17	5.0	71
G	17	5.0	71
H	17	5.0	71
Proprietary	**Acid Copper—0.00025-In. Thick**		
A	17	9.5	44
B	17	8.0	53
C	17	3.0	82

Brush Plating—A new selective plating method that goes by the tradename "Dalic Process" is fast becoming an effective engineering tool, Marv Rubinstein, metal consultant, told the platers.

It's used for build-up operations to repair worn or overmachined components, is effective as a selective stop-off for carburizing and nitriding and is used in spot sol-



$80 - 50 = 30\ \mu in.$

$\frac{30}{80} \times 100\% = 37.5\%$

Fig. 1—Surface roughness standard developed by General Motors to measure leveling ability of plating baths. Electroplate in this example gives 37.5 per cent leveling action

dering and in the precision fitting of bearings.

"The principle is similar to brush plating, but the tools (styluses) and solutions have been modernized," says Mr. Rubinstein.

How It Works—The work is not immersed in a plating bath. It is made cathodic by clamping a flexible cable to it. The cable is connected to a special plating rectifier.

The anode cable plugs into a stylus to which is attached a carbon anode. This anode, wrapped in a piece of absorbent cotton, is dipped into a special plating solution, then slowly moved back and forth over the area to be plated.

Due to the nature of the plating solutions, high rates of deposition are possible when the areas are relatively small, Mr. Rubinstein reported. For example, on one sq in. of surface, 0.0005-in. or more of tin can be plated in about 30 seconds.

Build-up is simple for a part such as a shaft, tube, regularly shaped die or bearing.

Take a shaft on which a 3 in. section has been overmachined. No stop-off is required. The part is simply rotated in a low speed lathe during plating.

Using a special choke to change the ripple factor of the rectifier, nickel or chromium thicknesses up to 0.005 or 0.006-in. may be obtained.

Stop-Off—Parts for carburizing or nitriding stop-off may be copper or tin plated in the heat treating department, suggested Mr. Rubinstein. He reported less thickness is required than for conventional plating, due to low porosity of the deposit. Copper 0.0005-in. thick is adequate in most cases; sometimes, as little as 0.0002-in. is all right.

Another use for selective tin plating that's just catching hold is to precision fit bearings into housings to a tolerance of 0.0001-in. or better. This is within tolerances specified for high speed electrical equipment on aircraft.

Hot Spots — In the 1600 to 2000°F range, molybdenum has better rupture strength than the best cobalt, nickel or Cr-Co-Ni-Fe base superalloys. Molybdenum base alloys have strength properties at 2000°F superior to commercial gas turbine blade materials at 1600°F. These properties are unequaled by any other material that has been tested.

Those facts were presented by Julius J. Harwood, head, Metallurgy Branch, Office of Naval Research, to point up the major obstacle limiting the use of molybdenum alloys in gas turbines: Their complete lack of oxidation resistance at temperatures over 1000°F.

"This problem is under intensive study and a variety of approaches is being investigated," Dr. Harwood said. "With the possible exception of sprayed metal coatings, electroplated coatings are the most promising for overcoming the poor oxidation resistance of molybdenum," he reported.

Best Candidates—Electroplated chromium and nickel layers appear to be the best for turbine blade applications up to 2000°F.

Dr. Harwood emphasized that the problem of molybdenum protection for gas turbine applications is not simple.

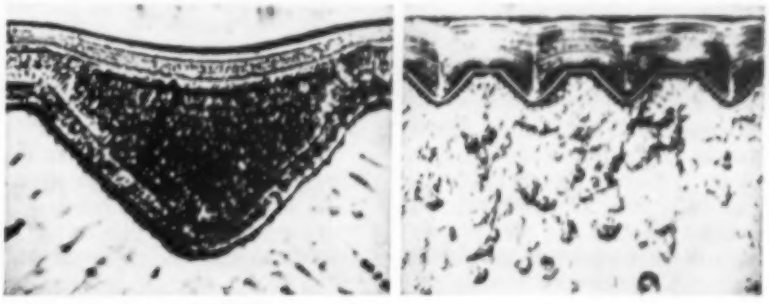
Oxidation resistance is only one of the characteristics which a coating must exhibit. Other features are equally important, including ductility, thermal shock and erosion resistance, resistance of impact deformation and rapid self-healing properties.

Big Factor—The greatest stumbling block so far is the complex requirement for a coating to stand high velocity impacts. This removes from consideration the use of brittle coatings, such as single layer coats, regardless of their satisfactory performance otherwise.

Where service does not involve thermal shock, mechanical impact or high stresses, molybdenum silicide and ceramic coatings should be quite useful, says Dr. Harwood. In the higher temperature ranges (above 2400°F) they are the only coatings that hold any promise.

Watch This — Along similar lines, research at Battelle Memorial Institute on elevated temperature properties of electroplates has shown the importance of using the right plating conditions to get oxidation resistance.

Battelle's W. H. Safranek re-



Close-up of Level Plating . . .

The photomicrographs above illustrate leveling characteristics of Hanson-Van Winkle-Munning Co.'s new bright nickel plating process, called "Levelume."

The left photo, magnified 1000 times, shows a grooved rough surface that has been plated with two coatings of Levelume. The first leveled the metal; the second, a thin coating on top, was applied for brightness. Total thickness is 0.0015-in.

The right photo, magnified 120 times, shows a surface with a series of grooves 0.0015-in. deep, that has been plated. Evenness of deposit comes from leveling action of plating bath.

At the Platers' Convention, Don Gardner Foulke, manager, electrochemical development, Hanson-Van Winkle-Munning, discussed current distribution on microprofiles based on work conducted with Otto Kardos (same firm). Dr. Foulke told how the characteristic dimensions of microprofiles were relatively small with respect to: 1. The product of the specific conductivity and the slope of the polarization curve. 2. The effective thickness of the diffusion layer.

The last point helps explain both leveling and microthrow, according to Dr. Foulke. It implies that the effective thickness of the diffusion layer is smaller for the peak than for the recess.

MORE JOBS FOR PLATING . . .

ported that plating conditions, such as current density and bath composition, are responsible for large changes in thermal stability and density of nickel and chromium plates alone, or in combination. A nickel sulphamate plating bath gave nickel plates with the best thermal stability.

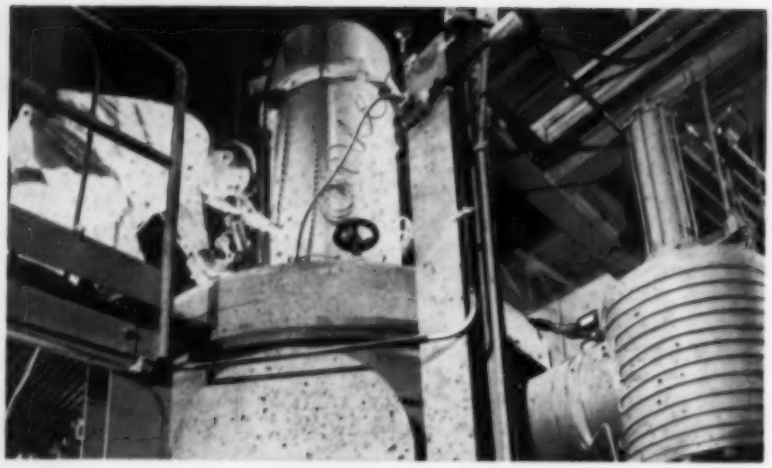
Moly Problem—Hoping to find an electroplate for molybdenum with better oxidation resistance, Battelle researchers plated specimens with alternate layers of nickel and chromium, starting with chromium, which can be deposited on molybdenum fairly easily.

When molybdenum plated with nickel-chromium is exposed to air at 1800°F, the moly base forms a diffusion alloy zone with the nickel and chromium. Also, the molybdenum diffuses intergranularly about five times as fast as it forms the alloy zone and volatilizes as molybdenum trioxide after reaching the air. Although there is no evidence of blistering or pinholing of the plated coating, 8 per cent of the weight of the specimen is lost in 100 hours at 1800°F.

Solution—Seeking an answer to this problem, Battelle found that a thin gold plate applied to the first chromium plate, followed by alternate layers of chromium and nickel, stopped the diffusion of molybdenum. The molybdenum-chromium diffusion zone beneath the gold layer grew as rapidly as it did without the gold, but the molybdenum did not pass through it, Mr. Safranek reported.

Aluminum Plating—A new bath for plating aluminum was described at the meeting by Dr. Nelson F. Murphy, Virginia Polytechnic Institute, Blacksburg, Va.

It's made up of a solution of aluminum chloride in a mixture of ether and organic amine. Several different amines and ethers may be used. The bath is less sensitive to moisture from the air than are other systems and can be operated at high current densities. A typical bath contains 12 per cent (by weight) of N-butyl amine, 33 per cent aluminum chloride and 55 per cent diethyl ether. Dr. Murphy described the aluminum deposits as adherent and smooth, and under some conditions bright.



The alloy is vacuum melted in this furnace at the Westinghouse Electric Corp.'s plant in Blairsville, Pa.

Superalloy for 1200°F

Developed especially for steam turbine blades, the new cobalt-nickel alloy has good magnetic and mechanical properties for high temperature applications

OPERATING temperatures of steam turbines seem destined to go to 1200°F within the next few years.

When they do, a new cobalt-nickel alloy will fill the bill for the blades.

The alloy, called Nivco, was designed by engineers at the Westinghouse Research Laboratories in Pittsburgh. It has properties at 1200°F similar to those of the 12 per cent chromium steel at 900°F. Its 100-hour creep rupture life is of the order of 50,000 psi at 1200°F, and its dampening capacity is about ten times that of similar alloys. It is nearly five times as strong as the 12 per cent chrome steels.

Plan Ahead—The research team that developed the new material was headed by Dr. A. W. Cochardt. He explains: "The mechanical behavior of a given alloy depends, at least in part, on its magnetic properties.

"Now after several years of research, we have discovered how to design needed mechanical behavior into certain alloys by control of their magnetic structure. This enables us to predict the behavior we will get by combining certain metals in different proportions, and we can do this without preparing and testing hundreds of thousands of potential combinations of two or more alloying metals.

"This technique is a major forward step in metallurgical research."

Major Hurdle — The research team huddled for nearly two years, pondering and exploring the dampening properties of metals essential for a turbine blade.

He says they found that dampening in the chromium steel is caused by an effect called magnetomechanical hysteresis. "In the initial stage, we made an exhaustive study of the magnetomechanical effects in metals, including . . . the tendency for certain metals to change dimensions under the influence of a magnetic field. This research furnished the basic knowledge needed for predesigning our new alloy."

Techniques used in the research should speed the discovery of other new alloys and insure that those developed will have the best possible properties within the alloying metals available.

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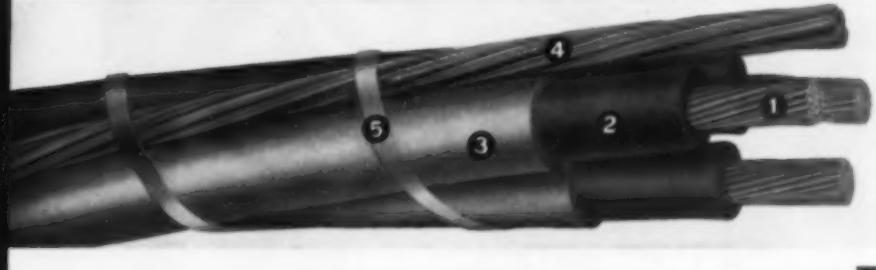

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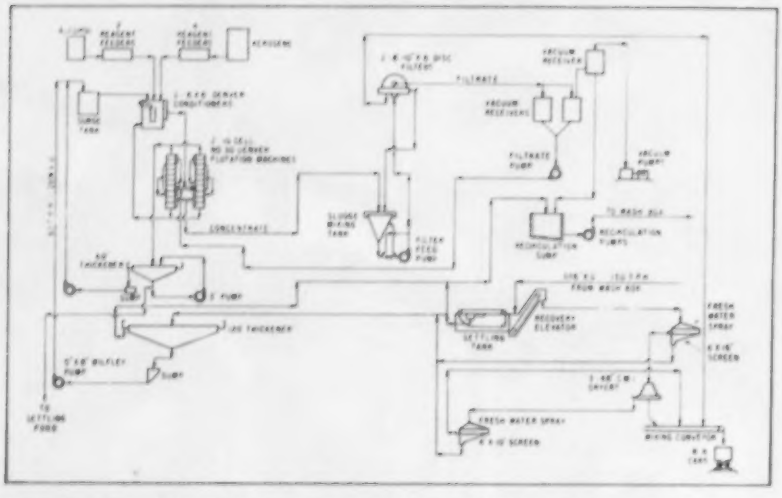

Flow diagram of the flotation circuit at Kaiser's coal beneficiation plant

Lower Ash for Better Coke

YOU INCREASE the capacity and efficiency of your blast furnaces every time you increase the quality of raw materials you feed into them. Behind that premise is the record of Kaiser Steel's three Fontana (Calif.) blast furnaces—an output consistently above 115 per cent of rated capacity, and a coke rate of less than 1400 lb per ton of iron.

Better raw material is part of the reason. Iron ore from Kaiser's Eagle Mountain (Calif.) mine is direct-shipping quality, but the company upgrades it in a modern beneficiation plant before shipment. Besides increasing furnace efficiency, this lowers shipping costs.

Coal, Too—Kaiser's Sunnyside, Utah, mines originally shipped coal after a simple crushing and washing operation. The coal preparation plant was completely rebuilt and enlarged in 1953 to reduce the ash content and gain capacity needed for a third blast furnace at Fontana. Again: Increased efficiency and reduced shipping costs.

But Kaiser's raw material department, under the direction of R. G. Heers, manager of mining and raw materials, feels there is always room for improvement. Recently, a flotation circuit was added to the coal preparation plant to reduce the ash content of the minus 28 mesh coal from an average 18.8 to 5.5 per cent. This results in a lowering of the total ash content of the coal shipped to Fontana by about 1.5 per cent, an increase in quality well worth the additional equipment.

Contrast—Before addition of the flotation circuit, minus 28 mesh coal received little cleaning in passing through the two Baum-type jigs which handle the 6 x 0 in. raw coal. The ash content of the 28 mesh x 0 fraction averaged 18 per cent, sometimes going as high as 22 per cent.

Now, minus 28 mesh material, after passing through jigs, dewatering screens, drag tank and thickener, is pumped to two 8 x 8 ft conditioners from the 120 ft Dorr thickener. Then, it flows by gravity to two banks of No. 30 Denver flotation machines.

Coal concentrate from the cells flows to a sludge mixing cone and is pumped to two 8-disc vacuum filters, which are 8 ft 10 in. in diameter, for dewatering. Tailings (averaging about 60 per cent) from the cells flow to a 60 ft thickener. Overflow from this thickener is recirculated as clear water through the system. Underflow is pumped to a tailing pond.

More Coming—All equipment for the flotation circuit is housed in the existing building. A few modifications of the supporting structure were made to take care of additional loads. Engineering and construction of the circuit were done by the Kaiser Engineers Division of Henry J. Kaiser Co.

Kaiser Engineers is constructing an addition to the beneficiation plant at the Eagle Mountain iron ore mine. Ore will be upgraded another 4 percentage points of Fe (to nearly 60 per cent) by next year.

Kaiser Steel Corp.'s coal mine at Sunnyside, Utah, is a major source of coking coal for the company's Fontana, Calif., mill. At Sunnyside, 725 miners produce more than 1,600,000 tons annually

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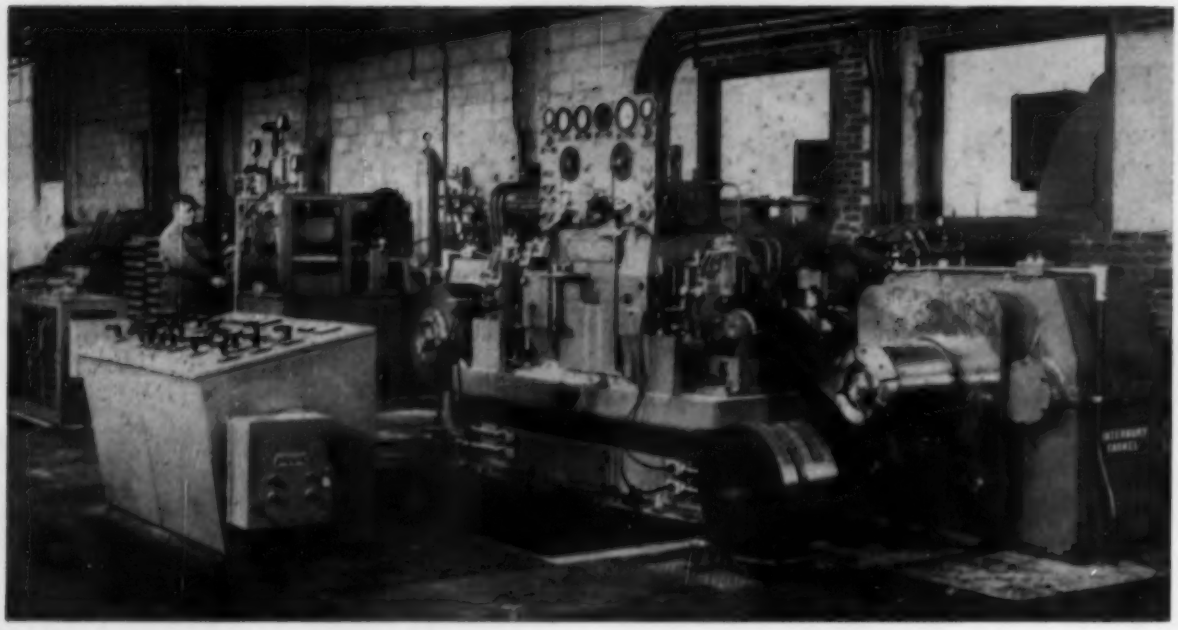
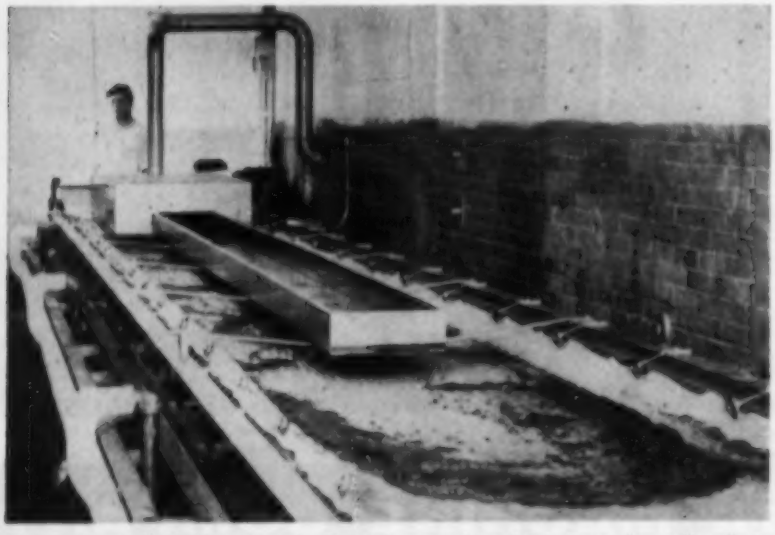


This 16-in. Sendzimir will increase production of high quality strip. It uses a coolant-lubricant for faster production

More Strip from a Sendzimir

GREATER reduction at each pass, no annealing between passes, fewer passes at faster speeds: Those are some of the advantages claimed for water - emulsifiable mineral oil when used as a combination coolant and lubricant in a Sendzimir mill.

The new 16-in. mill at the Forestville, Conn., plant of the Wallace Barnes Steel Division, Associated Spring Corp., is said to be the first designed specifically to use such a dual purpose coolant. Called Rycosol, it has four times the heat transfer rate of mineral oil. The extra cooling capacity permits speeds up to 1000 fpm.



The water-emulsifiable mineral oil used to cool and lubricate the mill rolls is filtered in this bed (designed by Delpark)

Solution — The coolant is a 20 per cent emulsion of oil which contains a water conditioner. Proper alkalinity is necessary to prevent staining and corrosion.

It is circulated through a filter which removes particles that could injure the strip surface.

Uniformity — A Sendzimir mill eliminates deflection or bending of the roll across the strip width. Production is uniformly thick to close tolerances.

The mill at Wallace Barnes is driven by a 500 hp, direct current motor; the two winders are powered by 400 hp motors. Such power makes possible greater thickness reductions at higher speeds.

With the coolant-lubricant, the mill produces with improved tolerances and finishes.

Pratt & Whitney automatic screwdown controls maintain constant strip thickness. Coiler gears and the pinion stand are lubricated by a self-contained pump and filtering unit. Winder blocks are hydraulically expanded. Both winders are equipped with hydraulic coil lifts and strippers.

THESE stamps are from the thirty-five countries in which McKee has done business. This organization has executed contracts for plants with a combined value well over a billion dollars. They include completely integrated steel plants, blast furnaces, and iron ore preparation plants; complete petroleum refineries and all types of processing units; chemical and petro-chemical plants and processing facilities.

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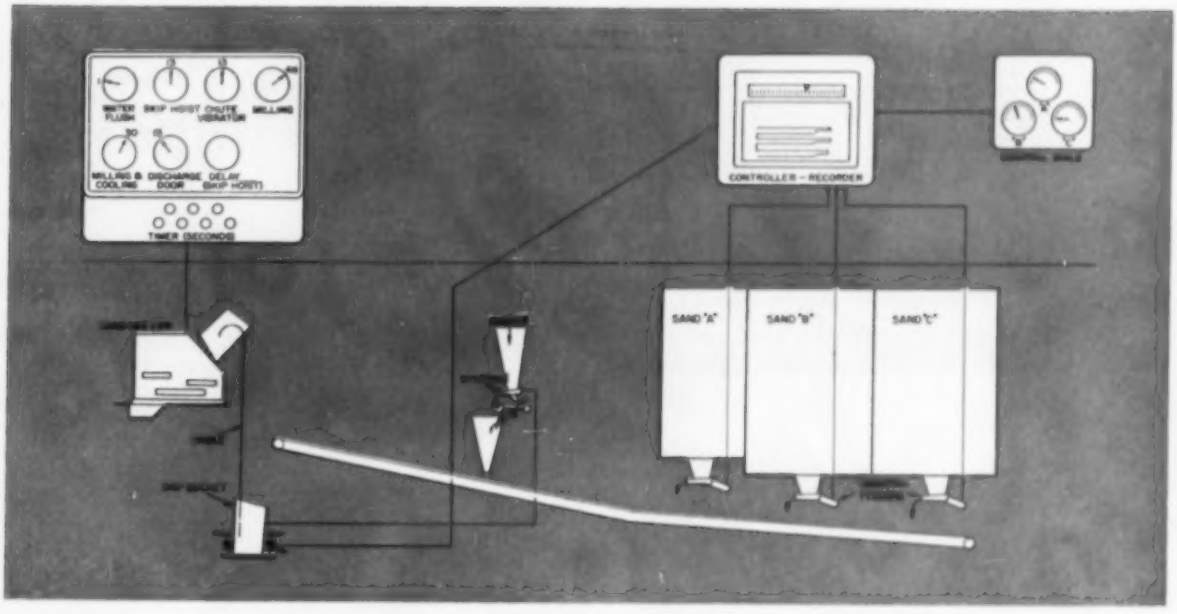


Automatic Mix for Molding Sand

MOLDING SAND preparation has gone automatic at General Steel Castings Corp., Granite City, Ill.

Automatic equipment delivers predetermined weights of sand and binder to a skip bucket, elevates the bucket, dumps it into a sand muller, times the operations of the muller and empties it.

Weight Control—Six systems for automatically proportioning molding sands by weight are in operation. Three Baldwin-Lima-Hamilton SR-4 load cells (2000-lb capacity each) are the weight sensitive elements of electric scales for each of the six skip buckets.

Sand feeders are cycled by a strip chart, recorder-controller.

Operation — A diagram of the system is shown above. Vibrating feeders under storage bins feed sands "A," "B" and "C" to a conveyor belt. The feeders are started by the controller-recorder when the skip bucket trips a switch on return to its filling position.

Sand "A" feeds onto the belt until a skip bucket weight signal from SR-4 cells to the controller stops the feeder. The feeder for sand "B" then is started; it delivers sand until the bucket weight reaches the predetermined value. If a third sand is required, this procedure is repeated for sand "C."

The amounts of each sand fed to the conveyor belt are regulated by three control dials on the panel; the dials can be set in 20-lb increments to 3000 lb.

Binder — The returning bucket also starts the bonding material vibrator. When enough material has been vibrated, the hopper tips and discharges onto the belt. The tipping operation opens a limit switch and stops the vibrator.

To assure discharge of all material, a standard door closer is used to delay the return of the hopper. Quantity of binder is controlled by the hopper counterweight position. Each mill is arranged for three binder materials.

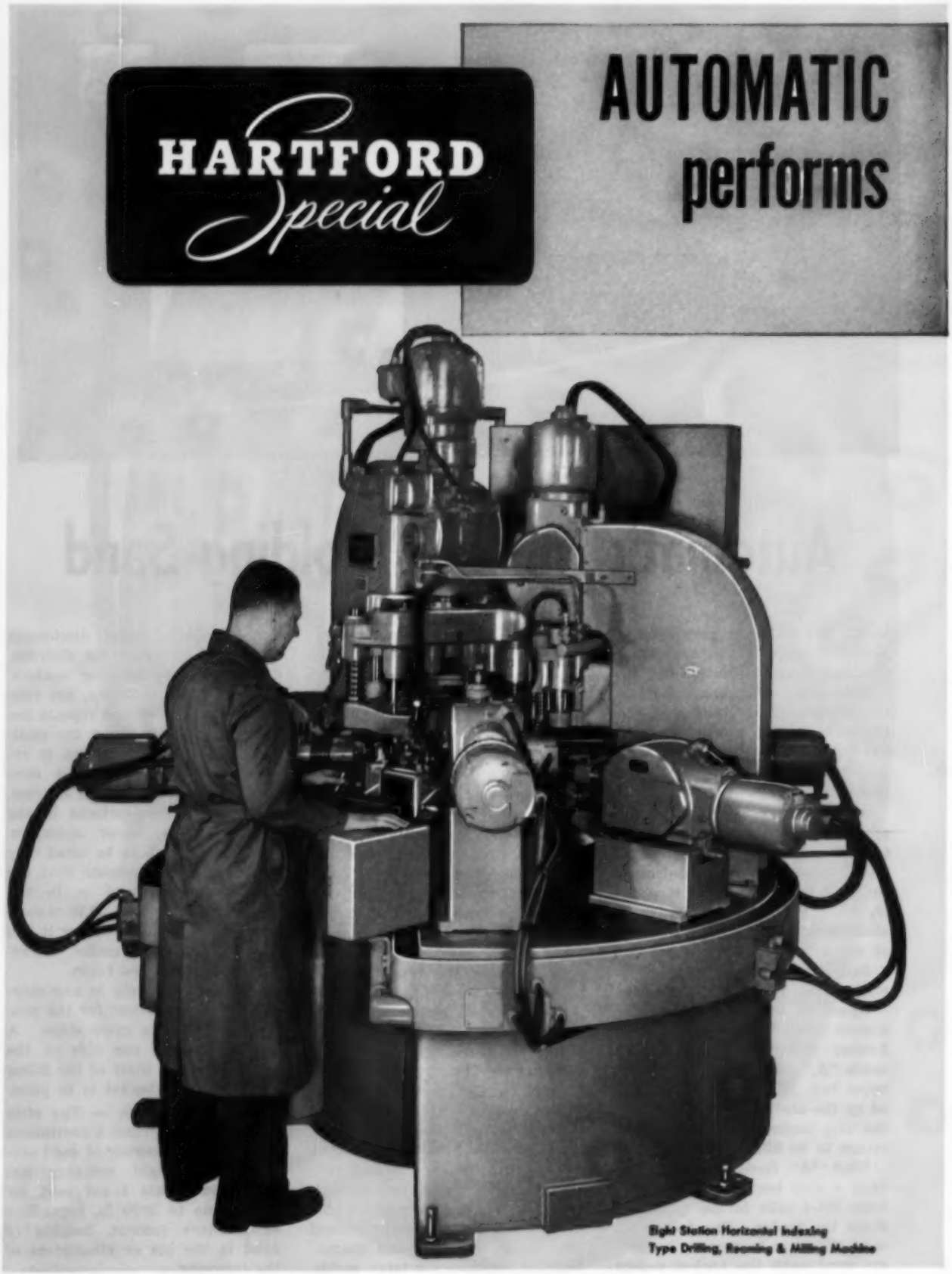
Muller — The muller operates through a 2-minute cycle, controlled by six consecutive timers. First, water is introduced into the mill. Then weighed sand ingredients are lifted and emptied (the skip bucket returns automatically). The sand, binder and water are mulled for a predetermined time to develop the sand characteristics required for large molds.

The prepared sand discharges onto belt conveyors for distribution to various molding centers. After the mill is empty, the controller resets itself and repeats the 2-minute cycle. During the mulling cycle, the skip bucket is refilled and ready with the next batch before the muller is emptied.

Trouble-Free—Interlocks in the system assure proper operation. The skip bucket can be lifted only if the load cells indicate that the full weight of sand is in the bucket. If more than 30 lb of sand remains in the bucket after it has been dumped in the muller, the refilling cycle will not begin.

If the sand supply in any storage bin is insufficient for the mix, the bucket filling cycle stops. A limit switch on one side of the bucket prevents start of the filling cycle until the bucket is in place.

Continuous Check — The strip chart record provides a continuous check on the accuracy of sand proportions. Weight accuracy has been held within 1 per cent for batches up to 2000 lb, regardless of moisture content, heights of sand in the bin or cleanliness of the conveyor.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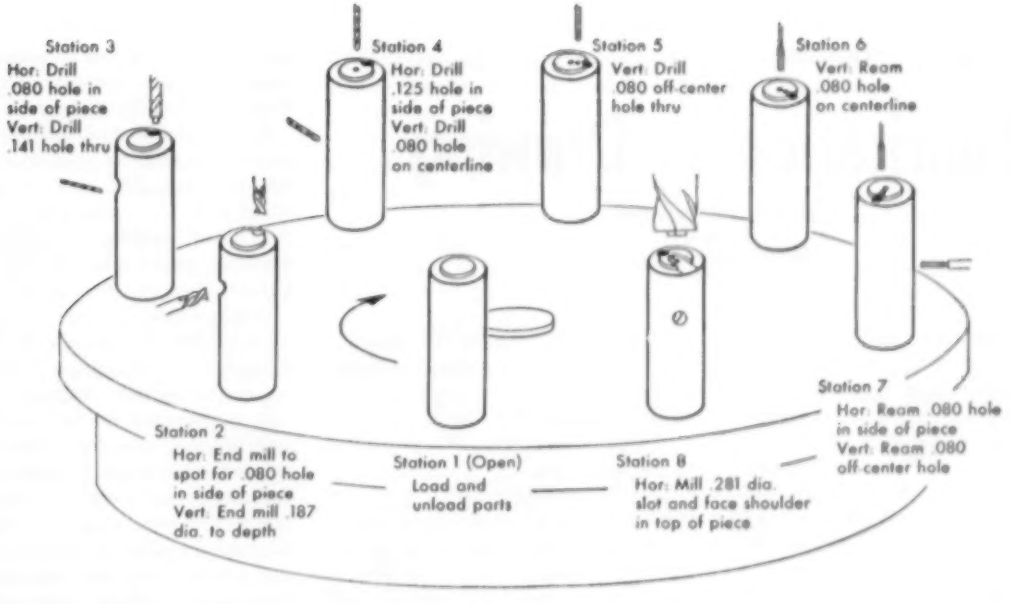
Station 3
Hor: Drill .080 hole in side of piece
Vert: Drill .141 hole thru
Station 4
Hor: Drill .125 hole in side of piece
Vert: Drill .080 hole on centerline
Station 5
Vert: Drill .080 off-center hole thru
Station 6
Vert: Ream .080 hole on centerline
Station 7
Hor: Ream .080 hole in side of piece
Vert: Ream .080 off-center hole
Station 2
Hor: End mill to spot for .080 hole in side of piece
Vert: End mill .187 dia. to depth
Station 1 (Open)
Load and unload parts
Station 8
Hor: Mill .281 dia. slot and face shoulder in top of piece

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Fig. 1—Rear brake oil deflector drawn in one operation from 20 gage (0.038-in), hot-rolled, pickled coil stock. Note large flange

Nelson Mfg. Co.

Fig. 2—One half of washing machine pulley drawn in two operations from 18 gage (0.050-in.), commercial quality, cold-rolled coil stock

MATERIALS AND APPLICATION—PART II

Lubrication in Drawing

By EUGENE D. VIERS
President
Kondor Products Corp.
Cleveland

MANY materials and compounds have been used in drawing lubricants with varying degrees of success, depending on the metal, gage, design and subsequent finish.

Mineral oil was the first consideration in early experiments, and sulphur was one of the first additives to be considered in the search for improved lubrication.

Detrimental — However, it was found that sulphur attacks brass, turning it black; it has a decidedly detrimental effect on nickel and most nickel alloys and is harmful to almost all stainless steels.

We have seen sulphur-bearing compounds turn plain cold-rolled steel jet black. Alkalis or alkaline compounds attack most nonferrous alloys.

Chlorine — Extreme pressure lubricant (EPL bases), for a time considered to be beneficial under certain conditions, was found to attack and pit the tools.

Chlorinated compounds cannot be used for fabricating stainless steel; they have a detrimental effect on the bright finish. Chlorinated compounds also are irritants to the workmen.

Slipperiness—The next step in the development of drawing lubricants, using mineral oil in every viscosity from kerosene to heavy cup greases, was the addition of non-oily substances in an attempt to impart "slipperiness."

Such materials as soapstone, chalk, fireclay, potter's clay and rosin were added to oils. Lead oxide (white lead in oil) was found to be efficient but is rarely used because it is difficult to remove from the work (it also causes skin infection). Graphite, zinc and aluminum oxides had certain benefical properties which were offset by subsequent harmful results.

Fats — About this time, "film strength" received much attention, and chemists turned to animal and vegetable fats, greases and oils. They found definite improvements.

Tallow and lard oil, wool fats and degras, as well as palm oil, castor oil, soybean and various chlorinated oils, were considered. Then the same routine of adding the non-oily materials to the fats, greases and oils followed.

Gravy—Beef gravy (a mixture of beef tallow, flour and water) was used with success in cold drawing seamless steel tubing.

A mixture of shellac, white lead and alcohol was for a time considered a satisfactory lubricant in replacing the metallic lead coating for cold drawing stainless steel tubing. In addition to a lead coating, copper, tin, zinc and cadmium have been used as lubricant films for metal drawing.

Phosphate—The phosphate treatment of steel is used as an undercoat before applying lubricant to parts which are formed by extrusion. In hot extruding tubing, fiber glass is used as lubricant.

SINGLE STAGE FORMING

One Operation—Fig. 1 is a rear brake oil deflector drawn in one operation from 20 gage (0.038-in.), hot-rolled steel, pickled coil stock. The unusual requirement in producing this part is the exceptional-

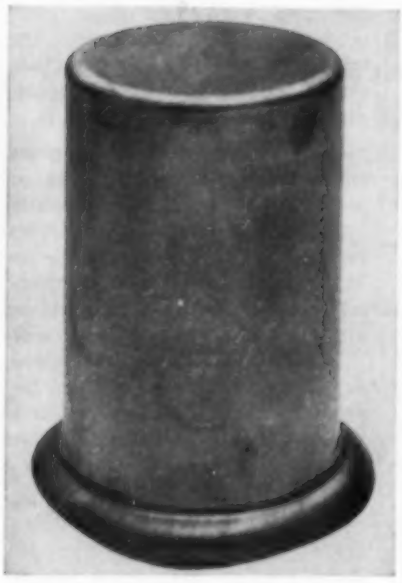


Fig. 3—Shell for automotive filter (6 in. deep and 4 in. in diameter) drawn in three operations from 14 gage (0.078-in.), cold-rolled steel

Geometric Stamping Co.

Fig. 4—Main cover of a vacuum cleaner drawn in four operations from 19 gage (0.042-in.), cold-rolled, satin finish steel

ly wide flange which is left. This mounting flange has to be drawn free from wrinkling and buckling. About every 25,000 pieces, the dies are given a slight touch-up, since the parts must be drawn free from scoring and scarfing.

Two Operations—Fig. 2 is half of a washing machine pulley drawn in two operations from 18 gage (0.050-in.), commercial quality, cold-rolled coil stock. The two sections comprising the pulley wheel must be identical and free from wrinkling and buckling. It is drawn free from scratching and scarfing; the manufacturer says that dies are seldom touched.

Three Operations—Fig. 3 is a shell (6 in. deep and 4 in. in diameter), drawn in three operations from 14 gage (0.078-in.), cold-rolled steel without annealing. The correct lubricant made this deep draw possible without breakage, scratching or galling.

Four Operations—Fig. 4 is the main cover of a vacuum cleaner drawn from 19 gage (0.042-in.), cold-rolled, satin finish steel. Note the beautiful finish retained on the significant surface, minimizing metal finishing and polishing.

MULTISTAGE FORMING

Work Hardening—Metals undergo a change in physical properties when they are drawn or formed. One change is referred to as "work hardening."

Frequently, the amount of work hardening increases to such a degree that an anneal is necessary before further forming can be done without failure.

Increases — Work hardening of the type we are concerned with increases after each reduction, if the part is allowed to remain in stand-by between operations.

If successive operations are continued through multiple stages with progressive dies, the amount of work hardening remaining is the same as that present after the first "cup."

Progressive Draw—Fig. 5 shows perhaps the smallest, yet one of the most difficult parts to lubricate we have had experience with.

Also shown is the type press or dieing machine used to produce this intricate part. It was drawn from 0.005-in., pure nickel coil stock, $\frac{5}{8}$-in. wide.

No Anneal—Note the eighth operation; the base of the shell is drawn back into itself for half the depth of the draw. It would have been impossible to form this final part without several annealing operations, if, after each stage of reduction, the part remained in stand-by for several hours.

The correct lubricant played no little part in making this production a reality.

Three Redraws—Such also was the case of the part shown in Fig. 6. It was blanked and cupped in one operation from coil stock and given three redraws to the final shell in uninterrupted multistage production.

Note the beautiful mirror finish on the surface of this shell, the result of the correct lubricant being circulated over the dies at each stage of reduction.

Commercial Stock — A small metallic particle occasionally would become attached to the draw ring. With ordinary compounds, this small pickup would become progressively worse, resulting in ultimate shutdown and die honing.

With the correct lubricant, this "bug" was completely removed after 50 to 300 pieces of continued production. The dies used to produce millions of these parts were made of ordinary machine steel, carburized and heat treated.

APPLICATION OF LUBRICANT

It is extremely important to apply a lubricant at every stroke of the press, never permitting dry metal to come into contact with the dies or draw ring.

Roll Coating—In deep drawing

parts from strip or coil stock, we recommend that lubricant be applied to the stock by roll coating. One method of applying lubricant to coil or strip is shown in Fig. 7; strip steel is being fed manually into an inclined press.

Fig. 8 illustrates this method. The stock also may be fed into the press by a "hitch feed."

Dope Pail — In brushing and swabbing the lubricant to sheet or dies, the "dope pail" became a familiar part of the stamping operation. When forming certain sections, such as panels or roof tops, as many as four pails were required at each press. The application by brushing or swabbing requires labor.

Steps were taken to apply lubricant automatically to the sheet through the "spider." The spider was a system of flexible tubes suspended above the lift of steel blanks and connected to a reservoir of lubricant through a hydraulic system. At each stroke of the press, a quantity of lubricant is spurted onto the top sheet. By trial and error, the flexible tubes may be directed to where lubricant is required.

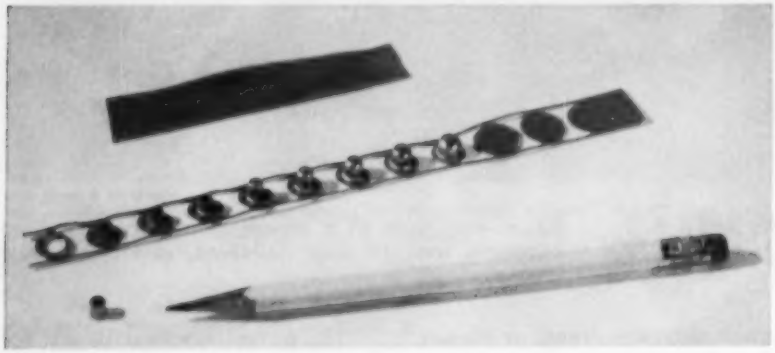
Draw Beads—In all draw press operations where draw beads or pressure pads are used to mechanically restrict the metal flow of irregularly shaped sections, we highly recommend that the properly selected drawing lubricant be applied to all blank holder surfaces.

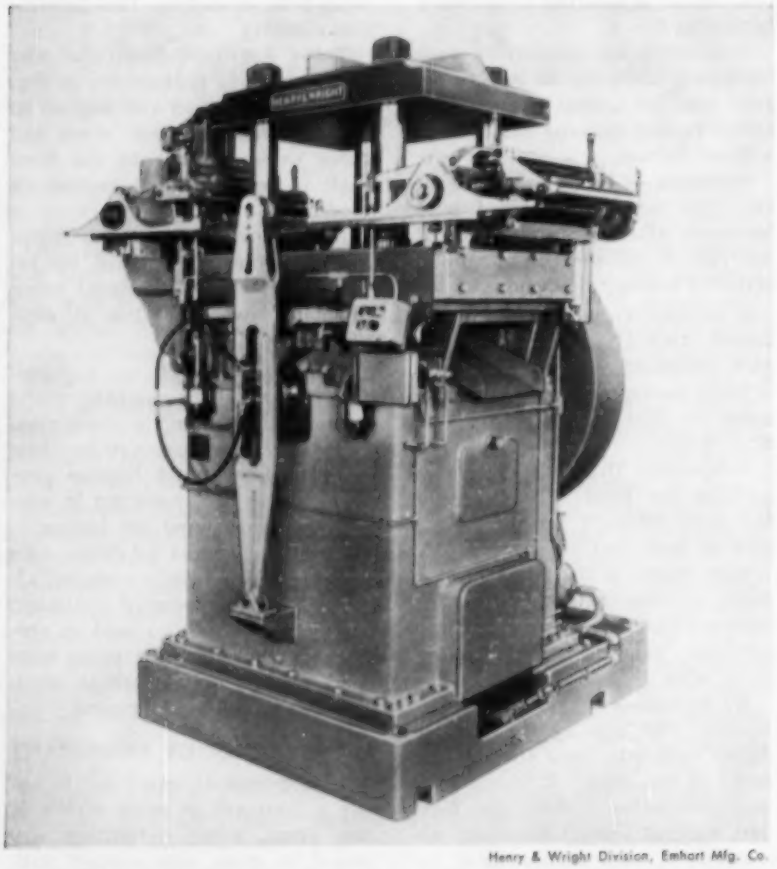
This includes all draw beads, as well as flat metal surfaces designed to hold the blank to control the flow of metal in stretching over the punch areas.

Like Clamps—If we do not apply lubricant to draw bead or pressure pad sections to prevent metal flow at these areas, we revert to early experiments of holding the metal in clamps.

The first few pieces held over the pressure pad at this unlubricated area may indicate an apparent improvement in results. This is misleading because a variable condition was introduced when the dry panel was drawn over the dry pad, resulting in metal to metal contact.

Failure—This results in pickup.





Henry & Wright Division, Emhart Mfg. Co.

Fig. 5—Electronic part drawn with multistage dies from 0.005-in., pure nickel coil stock, ⅝-in., wide, and a 25-ton dieing machine of the type used

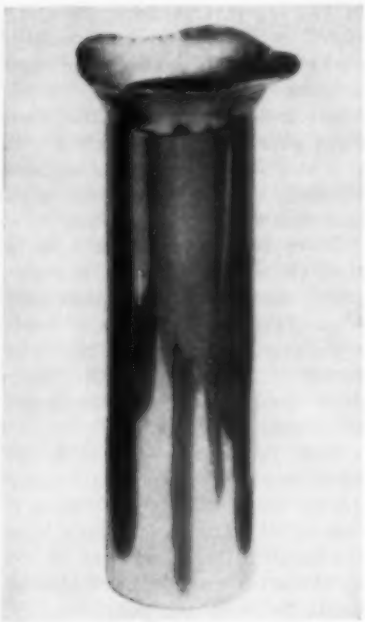
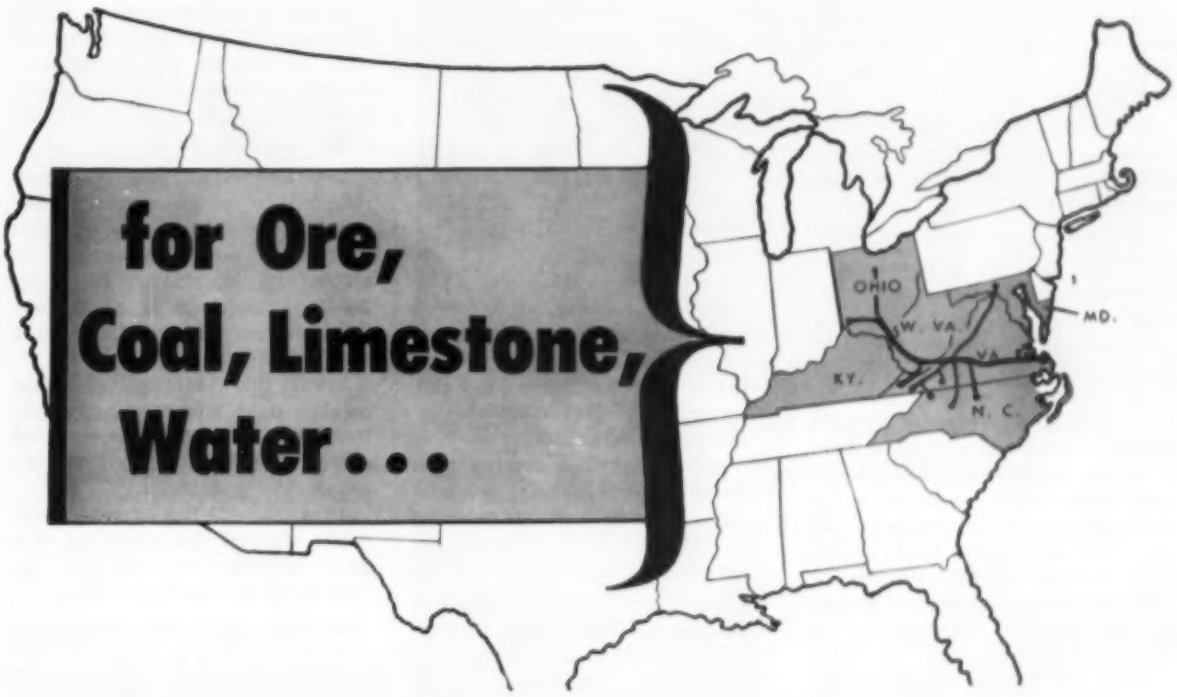


Fig. 6—Shell drawn in four reductions from 20 gage (0.038-in.), commercial, cold-rolled coil stock, without intermediate annealing. Note mirror finish

Attention Steel Executives



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Norfolk and Western Railway

which becomes progressively worse until the part fails by tearing, not only at the bead, but usually at random areas over the panel.

At this point, the beads and pressure pads must be polished with coarse abrasives, and the trial and error sequence continued. Early replacement of unlubricated draw beads and pressure pads is inevitable.

Much steel scrap is charged back to the mill as defective (laminated) when it is the result of misapplication of lubricant.

Die Automation—The properly developed drawing lubricant, scientifically designed to control the flow of metal over the pressure pads, gradually produces the ideal finish on all blank holder surfaces. This results in a uniform condition, permitting maximum production with a minimum of down time.

In the tryouts of a new design part using draw beads, it is far more practical to relocate a pad or use an additional bead where more stretch is required than to omit lubrication, or depend on the human element for success or failure of a given part.

Once the design and tool engineers have correctly located the pressure pads, lubrication of these areas should be completely automatic, through the application of "die automation," either by internally introducing the lubricant through the dies or by applying the lubricant to the same areas by properly designed spray guns.

Lubricant Dip—In cold drawing seamless tubing, including nonferrous as well as stainless steel, the method currently used is to batch dip the bundles of tubing into tubs or tanks of the diluted lubricant which is maintained at elevated temperatures.

The bundles are then raised out of the tub, excessive lubricant drained and the coating either allowed to dry or passed through ovens to force dry inside and out, prior to further reduction.

Phosphate is generally used as an undercoat before coating with lubricant. Experimental work is being conducted on introducing lubricants internally through the mandrel rod.

Lime Coating—For many years, wire and rod have been cold reduced by using a dried coating of lime. Bundles of the wire are dipped into a slurry of "properly aged lime" and dried, after which it is drawn through a "soap box." This is the method of applying a fine soap powder to the lime-coated wire immediately before it enters the reducing die.

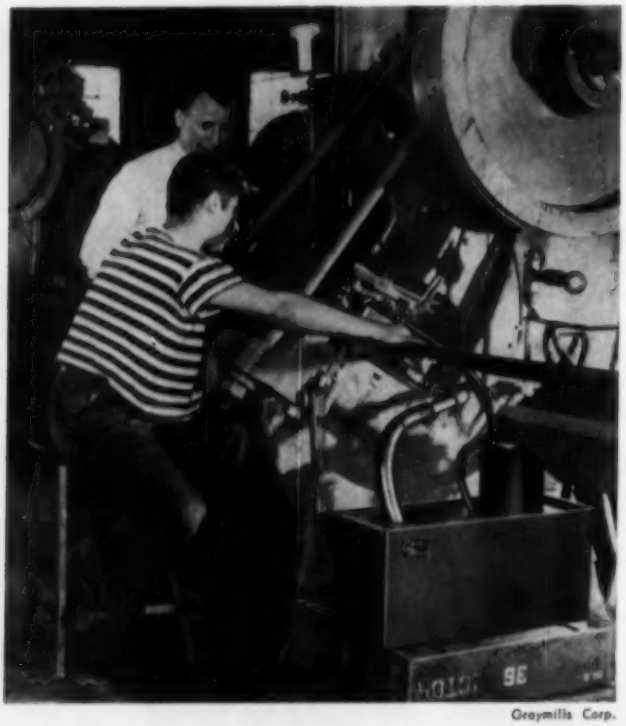
It was a natural step to adapt this material to other cold reduction, and during the recent war, several products were introduced to industry to facilitate steel cartridge case reduction.

Dry Coat—This type material, referred to in industry as "dry coat," consists mainly of high titer soap powder, dissolved in water and maintained at about 180°F. The slugs or blanks are batch dipped, then dried, leaving a hard coating on the blank.

Since this material is water soluble, light mineral oil is circulated over the punches to carry off excessive heat generated by the severe cold reductions.

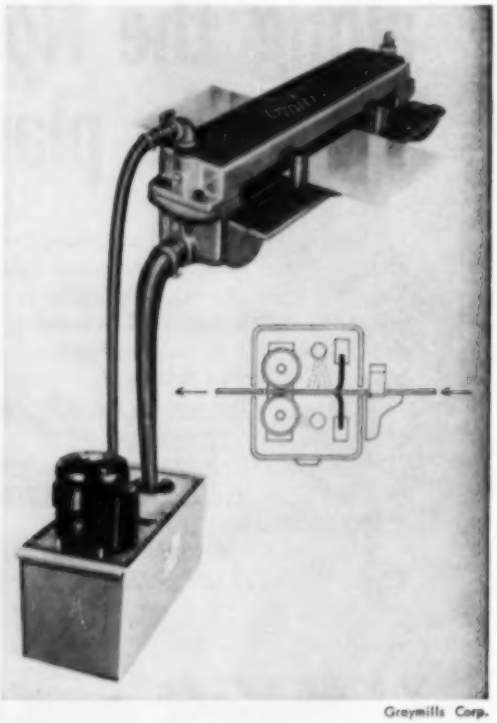
Part III of this article, next week, will list the properties of a good drawing lubricant and examples of successful forming.

• An extra copy of this article and the other two in this series are available until supply is exhausted. Write Editorial Service STEEL, *Penton Bldg., Cleveland 13, O.*



Greymills Corp.

Fig. 7—Strip is fed manually through lubricant roll coater

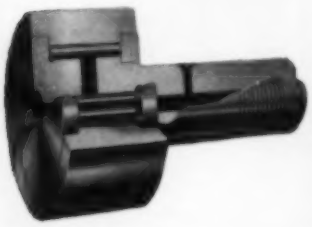


Greymills Corp.

Fig. 8—Lubricant roll coating equipment

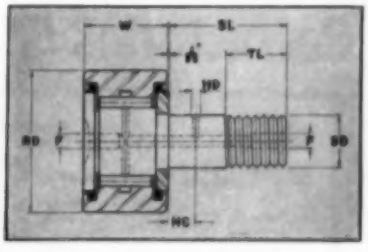
BEARING TIPS by McGill

BEARING BUILT FOR HEAVY-DUTY CAM LOADS



Camrol CF Bearings provide the ultimate in radial capacity, shock resistance and space economy for all cam actioned or guide and support roller applications. An extra heavy outer ring operates on a full complement of small diameter rollers supported by an integral inner race, roller retaining flange and stud. Designed as precision replacement for plain bearing or improvised bolt and bearing units.

New Sealed Bearing Adds to Versatility of Standard Cam Follower

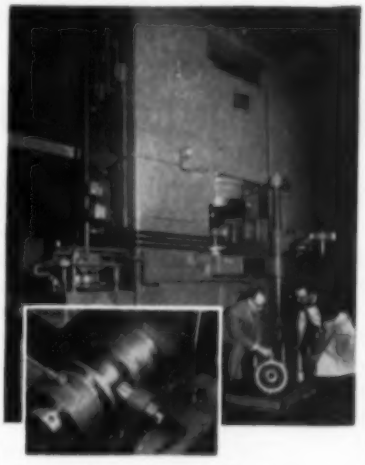


The new SCF series bearing keeps contamination out and lubrication in by means of specially-treated synthetic seals. The SCF bearing is interchangeable dimensionally with standard Camrol bearings.

140 Pages of Bearing Facts

Write for your copy of Catalog No. 52, a revised 140-page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.

CAMROL CF Bearings Cut Power Requirements on J. L. Ferguson Co. Packaging Machines



New Shear-Speed Shapers Achieve Greater Speed and Accuracy Using CAMROL CF Bearings

Michigan Tool Co. uses Camrol CF and CYR bearings in their new machines that produce gears up to 20 inches in diameter and up to 6-inch face widths in only 13 minutes. These bearings, acting as cam followers, accurately control cutting tool feed and relieve tools from the work on return strokes. They insure dependable, precision performance for automatic operation at high production speeds.

Up to 50 Camrol Bearings Used Per Machine

Used as load-carrying cam followers and as guide rollers in PACKOMATIC packaging machinery, McGill Camrol CF bearings have brought several desirable advantages to J. L. Ferguson Company in the eight years this firm has relied on Camrol Bearings.

Exceeding the performance of the roller and pin assembly formerly assembled in the Ferguson plant, the Camrol cam follower bearing has helped improve a variety of cam actuated operations on many of the versatile packaging machines built by Ferguson.

The Camrol CF bearings eliminate wear by reducing friction. This also reduces power requirements for the machines. The CF bearings cost less and are more easily applied than the previous assembly.

For trouble-free operation, up to 50 bearings per machine are now used by this company.

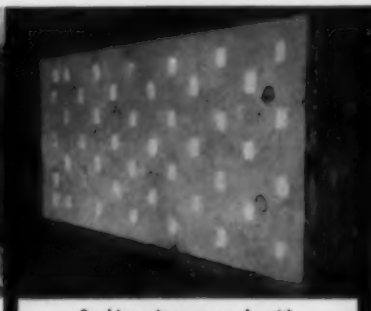
Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Full Type Roller Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

Profitable trends in the use of refractories

Car-type forge furnace with Laclede castable refractory walls



Soaking pit cover made with Laclede Plastic refractory

Car-type furnace lined with Laclede Castable and Plastic Refractories

Batch-type reheating furnace lined with Laclede Castable

Walking beam furnace with Laclede Plastic side and end walls

Time and cost savings explain increasing use of LACLEDE Castable and Plastic Refractories

Increasingly successful and profitable uses of castable and plastic refractories are changing refractory practices in many mills and plants. Experience shows that when castables and plastics are properly selected and installed, time and cost savings may amount to 300% or more. Results plus ease and speed of installation contribute to these savings.

Correct selection of castables and plastics is simplified by the availability of a complete range of Laclede-Christy products. Laclede-Christy produces castables and plastics to meet every condition.

Laclede offers refractories for high or moderate temperature service, and to meet specific insulating property requirements. Specific qualifications such as refractoriness, strength, thermal conductivity, abrasion-resistance and erosion resistance are met in varying degrees, according to the castable or plastic recommended and selected.

Undoubtedly you can use Laclede-Christy Castables and Plastic Refractories to profitable advantage. What's your situation? What more would you like to know? Your nearby Laclede-Christy representative will be glad to give you specific information.

Laclede-Christy Castable and Plastic Refractories

Castables for high temperature service to 2400° F and higher: Steelcast, Firmcast, Super Castable, Gun Cast and 3000° Castable.

Castables for insulating properties and service temperature to 2400° F: Porelite, Porelite 50, Porelite VL.

Pitco Plastic — for high temperature service (3150° F), where metal oxide penetration is severe.

Super-Set Plastic — for high temperature service (3150° F), where air dried bond is a factor, and where heat cannot be applied shortly after ramming.

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Handling Hot Lead

Heat control of stainless pipe used to transfer molten lead eliminated a "hot" problem

HIGH operating temperatures make it impractical to continuously feed molten lead chambers of hydraulic presses which extrude lead casing around electrical cable at Okonite Co., Passaic, N. J.

Presses are recharged at 30-minute intervals with 900 lb of lead from a storage tank through an L-shaped length of 3-in. stainless steel pipe.

PIPE OVEN
. . . maintains heat between charges

Hot Pipe — The transfer pipe must be hot. Otherwise, sudden contact with the 600°F lead would produce thermal shock and eventual deterioration of the pipe.

Formerly, the pipe was kept hot by cradling it over an L-shaped gas burner, but it frequently got too hot. Besides being difficult to handle, the overheated pipe oxidized some of the lead as it passed through it. Oxidized lead accumulated inside, and the pipe had to be cleaned out frequently.

Pipe Oven—Okonite devised an oven to maintain the pipe at 300° F between uses. It is shaped to fit the pipe contour and hinged along its longitudinal axis. Heat is supplied by three tubular heaters in series (2750 watts) in the bottom part of the oven.

Heaters are controlled by a bulb-and-capillary indicating controller made by Fenwall Inc., Ashland, Mass. The oven is sheet metal mounted on angle-iron legs. The lid section, bottom and sides have glass fiber insulation to cut heat loss and keep surfaces cool.

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An extensive plant expansion program recently completed provides the reserve capacity and flexibility needed to meet both your regular and emergency *immediate shipment* requirements for washers of all types—standard and special, any size, any metal, any quantity. Joliet remains the world's foremost producer of washers.

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SPECIALLY DESIGNED solve a problem,

Corrugated steel construction of these units provides strength, assures long service life. Special channel construction under boxes permits free movement of casters, yet allows four-way entry for lifting and storing.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

REPUBLIC BOXES speed handling ...save space

Today's modern high-speed machines may meet the demand for increased production. But they can also create problems.

This was the case at the Crown & Closure Division of Crown Cork and Seal Company, Inc., Baltimore, Maryland, world's largest maker of metal closures for glass containers.

Their problem was the handling, moving and storing of the tremendous daily output of a battery of screw cap machines. Some of the machines turn out as many as 100,000 screw cap shells per hour. A handling unit was required that could be used to rapidly move the semi-finished caps from the machines to a final manufacturing operation located on another floor—or to a storage area for future use.

Republic Materials Handling Engineers were invited to work on the problem with Crown Cork Engineers. The solution was the design and fabrication by Republic's Pressed Steel Division of the special box-type trucks shown at left.

Equipped with casters, the boxes can be moved easily by hand. A time-saving feature is a hinged door which opens when the box is tilted forward. This permits the caps to slide out and down a chute to the floor below where final manufacturing is completed. The entire handling operation is simplified and speeded. Storage space is conserved.

This is another example of customer service from Republic—another example of experience and versatility in solving a materials handling problem. Perhaps you would like to talk over your handling problems with a Republic Engineer. There's no obligation. Simply contact the nearest Republic Materials Handling Equipment Representative. Or send us the coupon.

STEEL

and Steel Products

SPEED HANDLING of heavy materials, like bar stock, with Republic Chain Slings, Attachments and Accessories. All Republic Chain Slings are proof tested and warranted to meet or exceed specifications. They provide an exceptionally high degree of safety. Republic's Bolt and Chain Division makes chain slings in Alloy Steel, High Test Steel and Wrought Iron. Republic chain engineers are always available to help you select the proper chain for your particular requirements.

SOLVE THE PROBLEM of storing heavy items with Republic Wedge-Lock Steel Shelving. It is specifically designed for high stacking of enormous weights. As more weight is added joints actually get tighter. Wedge-Lock Steel Shelving provides maximum loading in minimum floor space. It is completely flexible to meet changing space requirements. It can be assembled quickly and easily. Send coupon for full information.

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☐ Have a Materials Handling Engineer call.
Send additional information on:
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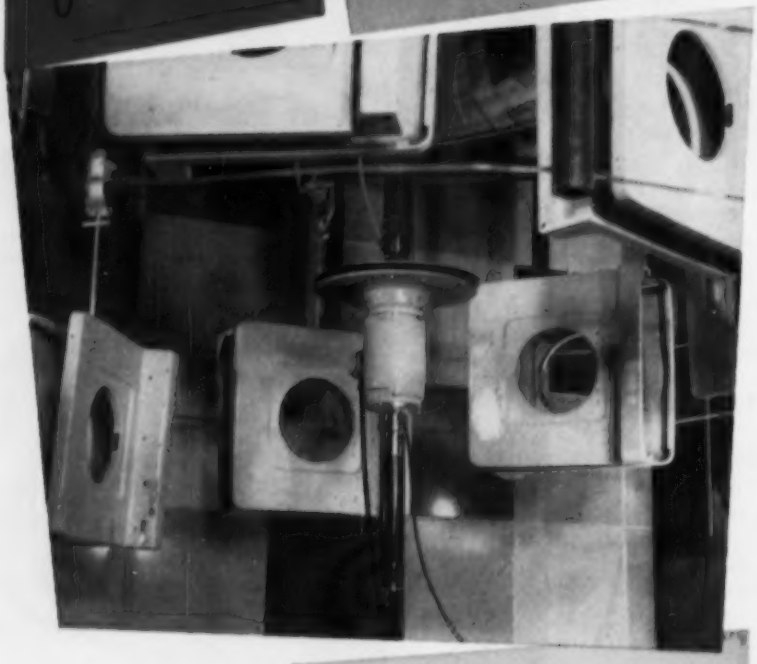
PORCELAIN ENAMEL
is being applied successfully—
Yes, even spectacularly—
with RANSBURG NO. 2 ELECTROSTATIC SPRAY PROCESS



General Electric—an extensive user of Ransburg Electro-Spray for painting with synthetic enamels—is the first to use Ransburg No. 2 Process in the application of porcelain enamel.

GE—less than a year in electrostatic production—now is processing almost a million square feet of cover coat each month in the General Electric Home Laundry finishing department at Appliance Park.

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Because of improved uniformity in coating thickness, weight of applied enamel was substantially reduced.

Because of lower application weight, the few rejected parts can be re-processed more times before being scrapped. This reduces the ultimate scrap rate by at least 95% of that previously expected.

Efficiency, measured by the amount of good ware, averages above 90%.

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Ransburg has fully equipped laboratory facilities including reciprocating disks, helical conveyors, stationary disks, and the latest advancements in equipment for applying porcelain enamel with the No. 2 Electrostatic Spray Process. Manufacturers are invited to send sample products to our Indianapolis laboratories for tests and demonstrations to prove for you the advantages and benefits of electrostatic spray application of porcelain enamels.

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RANSBURG

Motor Loses Weight

Die-cast magnesium parts and a new stator design cut shipping weight and expense

CONVERSION to magnesium stator shells and end frames and a new design for stator laminations cut a pound per unit off a new line of alternating current motors.

Made by Redmond Co. Inc., Owosso, Mich., the motors are a redesigned version of a shaded pole line, with ratings of 1/35 to ¼-hp, and a new split capacitor line, with ratings of 1/30 to 1/3-hp. They are used in heating, ventilating and air conditioning equipment.

Weight Savers — Part of the weight saving is due to the use of magnesium.

Additional weight was eliminated by flattening stator laminations at four points on the periphery. This permits the use of narrower sheet stock and reduces scrap.

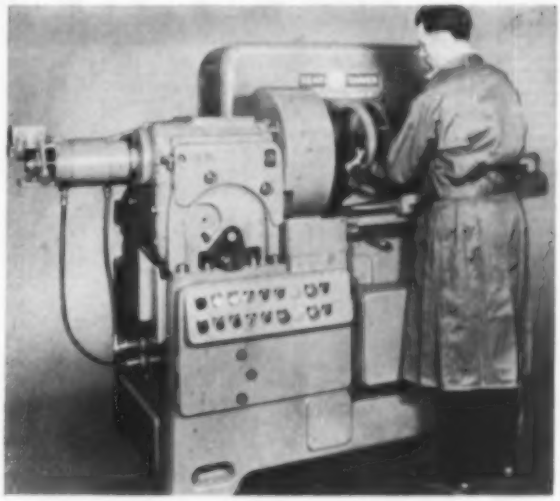
MAGNESIUM STATORS
. . . come out of cold chamber machine

New Design—In the stator of the shaded pole motor the lamination exposure of the previous model is eliminated.

The magnesium stators are diecast around the lamination stack by the "Uni-Cast" process. End frames are diecast by the high speed magnesium hot chamber process.

As a result of the cut in weight, freight charges from Redmond's Michigan assembly plant to Los Angeles have been cut by as much as 6 cents per unit.

Internal Gear Shaver Speeds Loading and Unloading



Model GCR uses a semiautomatic loader to eliminate hand loading in the shaving of internal spur and helical gears.

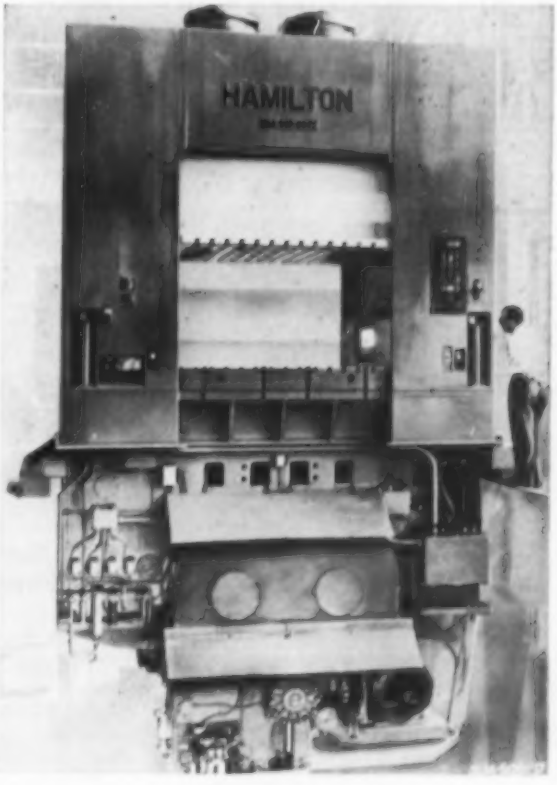
Range: Gears with 3 to 12 in. pitch diameters, having teeth up to 4 diametral pitch and tooth face widths up to 2½-in.

With the semiautomatic loader, the operator merely hangs the gear on the shaving cutter, presses a cycle control button and removes it from the workhead after it is shaved.

Taper shaving can be done. Either conventional shaving, with cutter reciprocation, or plunge-cut shaving, without cutter reciprocation, is possible.

A transparent plastic insert in the cutter guard enables the operator to see the operation during the cutting cycle. Change gears are provided for work spindle and cutter reciprocating drives. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Mechanical Draw Presses Have 500 to 1000 Ton Capacities



Features of this welded steel, underdrive press:

1. The operating mechanism in the press bed makes for easy inspection and maintenance without delaying production.

2. Counterbalance cylinders have a swivel arrangement which permits proper alignment when gibs are adjusted.

3. The lubrication system provides automatic and gravity-flow lubrication to all bearings.

4. The unit has an eddy current clutch.

5. Package design encloses all piping and wiring within the press structure to speed up installation and protect against damage. Installation is complete when piping and wiring are connected to plant power services.

6. Safety die blocks and die lights are used.

Beds range from 84 x 72 in. to 200 x 100 in.

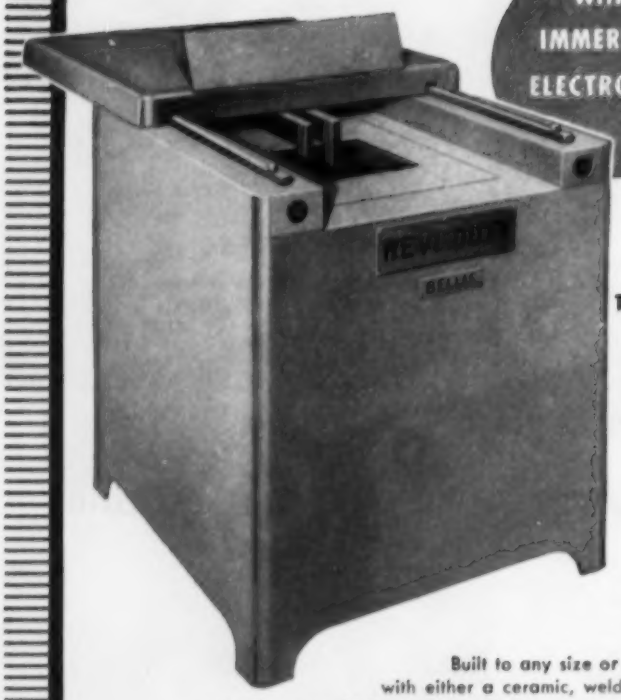
Various cycle sequences are available. The press may have a fast advance and return and maintain a safe drawing speed. This assures more productive strokes per minute.

Preventive maintenance is simplified by locating the driving mechanism in the press bed. Parts are within easy range for visual inspection while the press is operating.

When closer inspection or adjustment is needed, the work can proceed on the basement level without interfering with nearby operations on the production floor. *Write*: Baldwin-Lima-Hamilton Corp., 545 N. Third St., Hamilton, O. *Phone*: Twinbrook 4-6511

HEVI DUTY BELLIS SALT BATH FURNACES

WITH IMMERSED ELECTRODES



Temperatures from 300° F. to 2400° F.

Built to any size or capacity with either a ceramic, welded steel, or alloy pot whichever the particular process requires.

SPECIAL FEATURES of the HEVI DUTY BELLIS FURNACES

- Immersed alloy electrodes with the patented water-cooled terminals prevents the conduction of heat to the transformer.
- Self-contained ceramic pot quickly removable. Ceramic, steel, or alloy pots are interchangeable — thus one furnace can be used for a variety of operations by merely changing to the pot best suited for the process.
- Electric starting coil quickly and easily remelts the salt after a shut-down.
- Recessed electrodes permit a rolling cover, thus minimizing heat radiation from the bath surface.
- Sturdy construction means years of dependable service.
- Low operating voltage eliminates shock danger.

These features along with the many other advantages of salt bath furnaces such as versatility, economy, exact temperature control, mean to you savings in time, money, and material.

Send for complete information in Bulletin 655.

HEVI DUTY ELECTRIC COMPANY

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Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers ***Constant Current Regulators***

NEW PRODUCTS and equipment

Clamshell Bucket

The ⅜-yard capacity X-LR38 is called an extra light rehandler. It is made especially for 6 to 12 ton equipment.

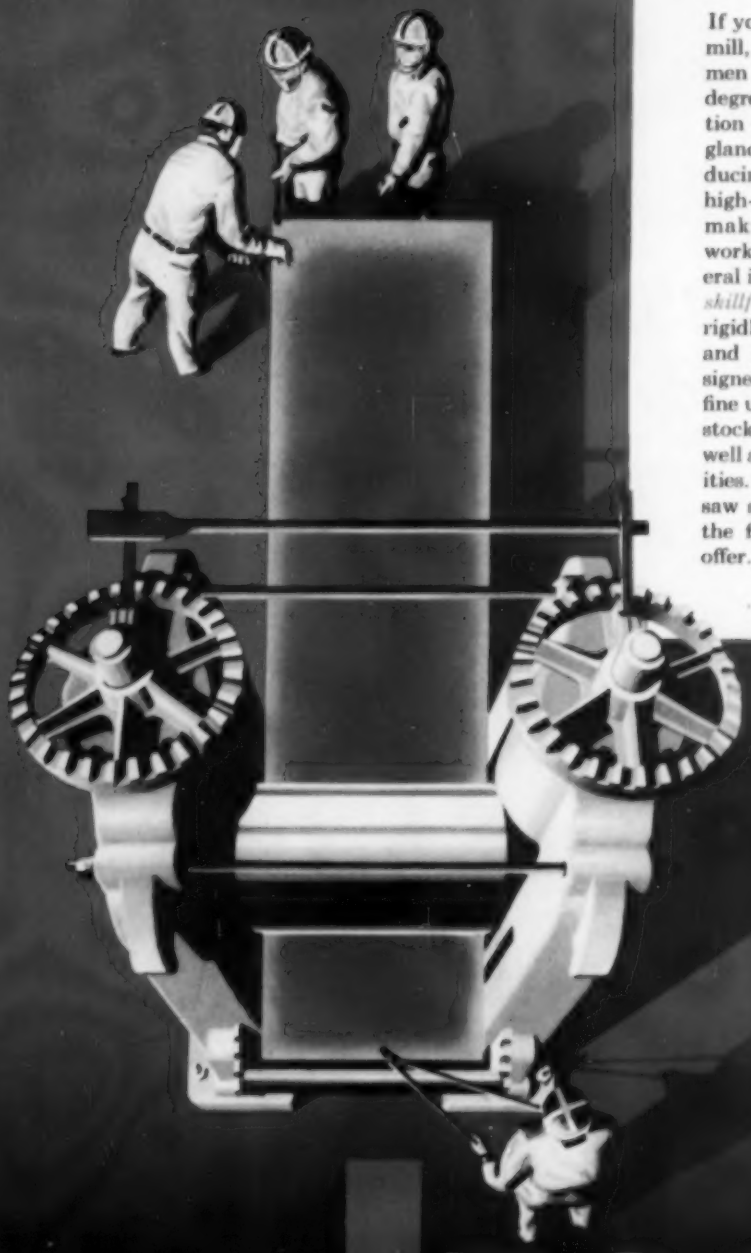
The bucket has block and tackle and lever arm action, a rigid, one piece welded head and continuous wrap-around reeving. The unit is available with or without teeth and counterweights. *Write*: Erie Strayer Co., Geist Rd., Erie, Pa. *Phone*: 2-6727

Welding Wire Dispenser

Payoffpaks protect wire from corrosion or coil distortion. They are compact, easily opened and resealed, easily rolled and stacked and take little floor space.

Continuous welding: Up to 500 lb of weld metal can be deposited,

How Jessop skill makes better saw steel



If you could peer down into the Jessop mill, chances are you'd see groups of men hand-rolling sheets of steel with a degree of skill and careful concentration that might seem excessive at first glance. *Yet it isn't.* These men are producing a very special steel—top quality high-speed sheet which is used in the making of hack-saw blades, woodworking tools, metal-slitting saws, general industrial knives, and the like. But *skillful finish rolling isn't all.* Jessop rigidly controls its melting formulas and pours small ingots specially designed for cross rolling. This insures a fine uniform grain structure so that the stock blanks well, forms well, swages well and has superior edge holding qualities. Remember, when you order your saw steel from Jessop, you are buying the finest that Jessop experience can offer. *And that's mighty fine steel.*

JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

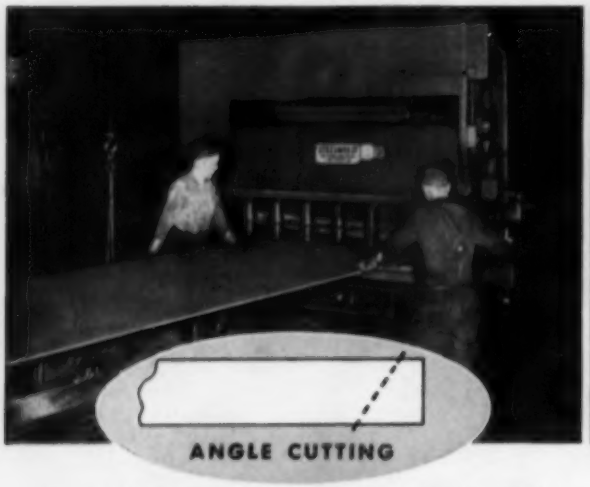
OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Toronto

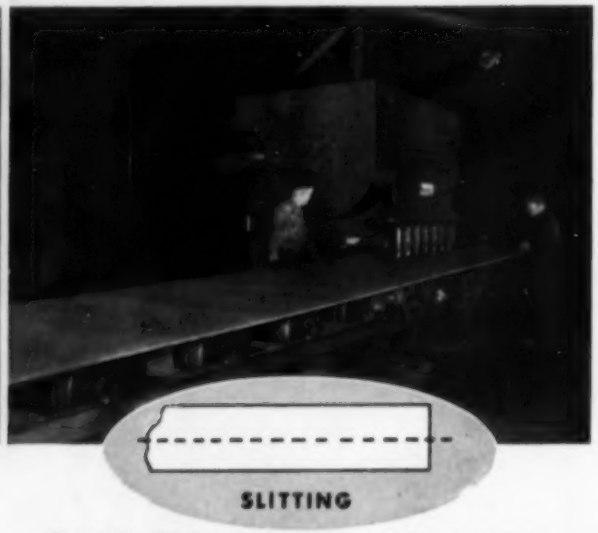
Jessop Steel International Corp., Chrysler Building, New York, New York

Steelweld Shears operate on the widely acclaimed pivoted-blade principle. Shear action is controlled by electric foot switch. Machines for making cuts up to 24'-0" are now in service.

Here's a **VERSATILE SHEAR** that *Speeds Production*



Because of the deep throat in end housings, larger size sheets or plate can be cut at various angles than possible with most shears. This is also a great advantage when notching and slitting.



The standard 24" throat depth permits slitting sheets up to 48" wide on any line. 36" throats are also available for larger machines.

SQUARE or angle cut, slit or notch — any can be made quickly on a Steelweld Shear.

Not only will Steelwelds handle every kind of cut, but they are provided with unusual features that make their operation easier and faster and assure accuracy.

Send for the catalog below. Learn why Steelweld Shears are the most outstanding on the market today.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

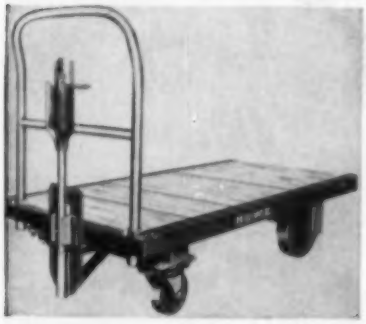
7837 East 282nd St., Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

without down time or the replacement of small coils or reels. Wires, from 0.030 to ⅛-in., feed steadily and smoothly. A complete line of analyses is available. *Write*: Page Steel & Wire Division, American Chain & Cable Co. Inc., Monessen, Pa. *Phone*: 102

Dragline Trucks

An all-welded steel framework is used on this line of easy rolling trucks. The hardwood deck is replaceable. It is light and provides a long lasting, nonslip, cargo carrying surface.



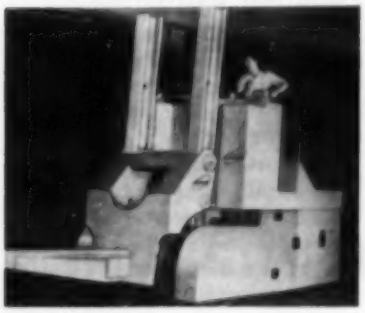
Platform sizes and load capacities are built to requirements. Deck heights range from 7½ to 14 in. *Write*: Howe Scale Co., Rutland, Vt. *Phone*: Prospect 5-5541

Ram Trucks

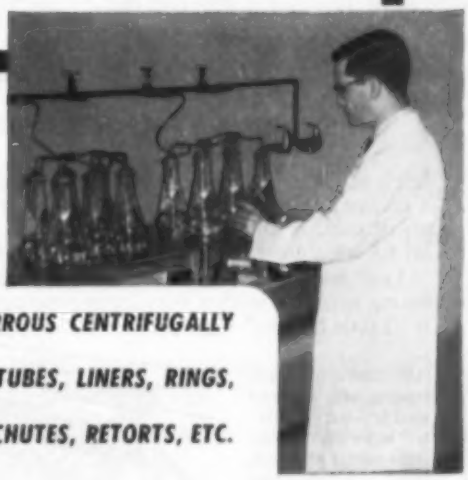
A heavy duty line of electric powered ram trucks has capacities from 20,000 to 80,000 lb.

Two electric motors power the trucks. Each motor drives a pair of front wheels. Each pair of wheels has a separate drive reduction unit.

Other features: Caster type trail-



To Rely on SANDUSKY Is to Rely on Research



CHIEF SANDUSKY

FERROUS AND NON-FERROUS CENTRIFUGALLY CAST ROLLS, SLEEVES, TUBES, LINERS, RINGS, BUSHINGS, BEARINGS, CHUTES, RETORTS, ETC.

There's a great deal more to a centrifugal casting than the finished product itself. It starts in the early stages of development and planning when Chief Sandusky technicians, through research and test experience, are able to specify valuable procedures that will save production expense and man-hours in your operation.

Add to this research the right materials and consistent control and the result is a ferrous or non-ferrous casting which will do its specific job while resisting heat, abrasion, and corrosion as required. An additional service is machining facilities for turning, boring, and drilling.

Rely on Chief Sandusky as an organization of specialists with the answers to your problems with the finest of centrifugal castings.

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Chief SANDUSKY CENTRIFUGAL CASTINGS
FERROUS AND NON-FERROUS
SANDUSKY FOUNDRY AND MACHINE CO., Sandusky, Ohio

DO-IT-YOURSELF PLATING

THE FINISHING TOUCH

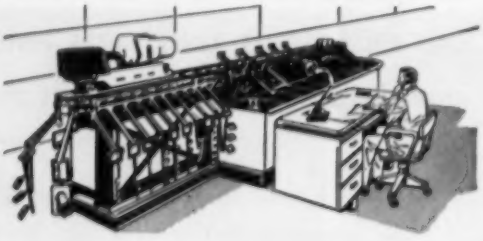
by A. B. HOEFER
Vice-President
FREDERIC B. STEVENS, INC.

Low Cost, Space Saving Machine Will Increase Profits

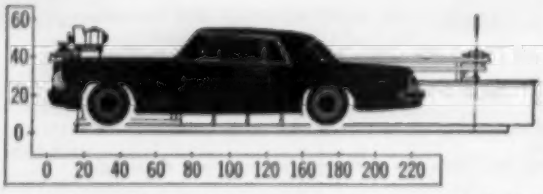
Lack of floor space or initial cost of equipment has turned many a company away from the thought of installing their own automatic plating and processing equipment. If you are in this group, let us tell you what "Little Steve" can do for you.

Last year, we brought out a small automatic plating and processing machine with a very large production capacity. We named it "Little Steve."

"Little Steve's" tank height, including base, measures about 32"—that's only 1½" to 2" higher than the height of the average office desk. In fact, at its highest point (drive end) "Little Steve" is just a little higher than a conventional 4-drawer office file cabinet.



Since it is only seventy-two inches wide, forty-two inches high and built in sections of six feet in length, it offers practically no space problem. Being small in size "Little Steve" means a low initial investment. It will do electroplating, anodizing, enameling, bright dipping—in fact most anything in the immersion processing line.



At its highest point "Little Steve" is even lower than the modern motor car—what's more, it costs less per foot — AND "Little Steve" will pay back its cost in 6 to 24 months.

If you wish to finish parts such as small electrical appliances, door hardware, pistons and plumbing fixtures—and require controlled high production—"Little Steve" should be your answer.

"Little Steve" will give you increased production, automatic control and will pay for itself in from six to twenty-four months. It's easy to operate. Let us give you more details. Write us today. *Frederic B. Stevens, Inc., 1814 Eighteenth Street, Detroit 16, Michigan.*

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FROM CASTINGS OR STAMPINGS TO
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NEW PRODUCTS and equipment

ing axle, steel mill type electrical controls and hydraulic power steering and brakes. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Lift Trucks

These units (in the 3000, 4000 and 5000 lb capacity series) are mounted on pneumatic tires. They have short turning radiuses and trunnion steering wheels.

Brakes have a total of 125 sq in. of braking area and are self-energizing in both directions.

Forward speed is 13.8 mph. Loading speeds are 48 fpm for the largest model, 50 fpm for the other two. *Write*: Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. *Phone*: Atlantic 8-5011

Heat Indicators

Tempilstiks (they melt at a known temperature) indicate the heat of metals. Two new ones (for 525 and 575°F) are available. *Write*: Tempil° Corp., 132 W. 22nd St., New York 11, N. Y. *Phone*: Oregon 5-6610

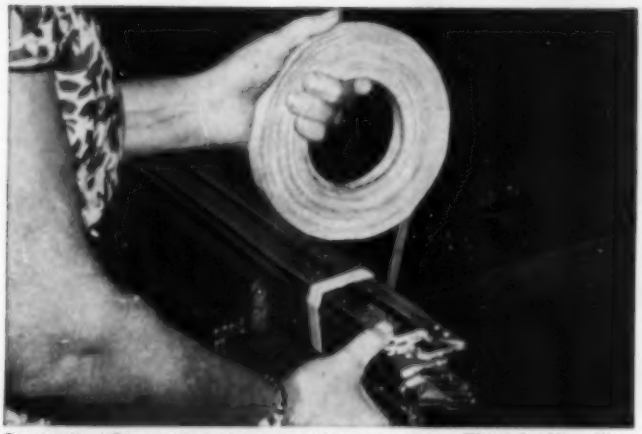
Pollution Extractors

Model AO-125 supplies up to 100 cfm of clean, dry air to as many as six spray guns at a time. An enlarged air regulator has increased air capacity.

Model AO-124 is for use on main lines requiring nonregulated air; its high air capacity results from larger air inlet and outlet sizes.

A combination of spiral baffles with absorbent filters in the ex-

Polyken Tapes have
CONTROLLED STRENGTH
(and that's what saves the money)



Controlled Strength solves packing problems. This job of bundling aluminum strips requires only a narrow strip of *Polyken* Tape No. 113, 1½ times the circumference of the bundle . . . at a considerable saving of time and tape.

Controlled Strength offers greater protection. These cutting tools are guarded with a durable, abrasion-resisting sheath of *Polyken* Tape No. 113. Twice as much of a fragile tape wouldn't give stored tools equal protection.

CONTROLLED STRENGTH:
the right combination of backing and adhesive to give you "all work —no waste"

Here's how it can help you: Because you can select the right *Polyken* Tape for the right job, you get all the sticking power . . . all the tensile strength . . . all the tear resistance you need. When you need special qualities, there's a *Polyken* Controlled Strength Tape that has them.

That way—the Controlled Strength way—you do the job *right* for the *least* amount of money.

Take *Polyken* No. 113 as an example. See how this low-cost tape works harder . . . and more efficiently . . . through its "just right" application to the job at hand (whether it is sealing, holding, bundling or protection).

In fact, plant surveys show this tape is being used for more than 245 specific applications—all at a savings!

Use this convenient coupon to find out how *Polyken* Controlled Strength Tapes can mean "all work—no waste" on the job for you.

Polyken, Dept. S-G
222 West Adams St., Chicago 6, Illinois

Please send me physical properties and further information on *Polyken* Controlled Strength Tapes.

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Company _____

Street Address _____

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Ready-Power Continuous-Duty

DIESEL ELECTRIC

POWERS INDUSTRY'S LARGEST LIFT TRUCKS

AMAZING DURABILITY!

UNBELIEVABLE ECONOMY!

This 80,000-lb. twin ram lift truck, operated in one of America's largest steel mills, is equipped with interchangeable Ready-Power diesel electric model RD-18. Continuous duty full power is assured *at all times.* The low operating and maintenance costs attained are possible only through the use of diesel-electric drive. Ready-Power offers a full range of diesel electric and gas-electric models for all truck sizes. *Write for complete information.*

READY-POWER

The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

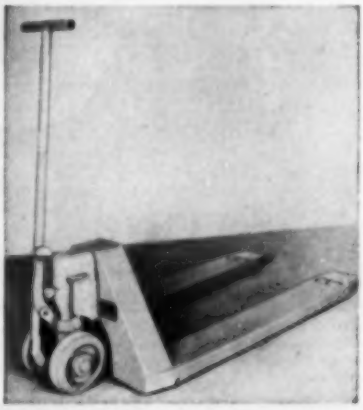
Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

NEW PRODUCTS and equipment

tractors removes moisture, oil, rust, dirt and other foreign matter from the air before it reaches the spray gun. *Write*: Binks Mfg. Co., 3122 Carroll Ave., Chicago 12. Ill. *Phone*: Van Buren 6-4200

Pallet Truck

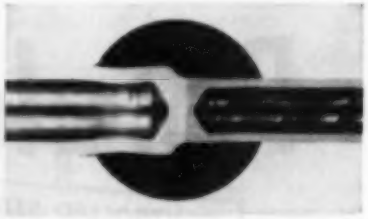
Model HX is a hydraulic hand truck for quick handling of pallet loads up to 1 ton. Weight of the truck is less than 200 lb.



Forks have a full 4½-in. lift. Loads are raised to travel position by a foot treadle. The treadle is attached to the pull handle, which allows operation from any angle. There are two lowering foot treadles, one on each side of the central hydraulic unit. *Write*: Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill. *Phone*: Northbrook 2300

Electrical Connector

The Alcunector joins aluminum to a copper electrical conductor to eliminate galvanic corrosion and thermoelastic ratcheting.



In one form, a deep aluminum cup and a copper cup are buttwelded together at the closed ends and hermetically sealed in a rubber ball

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Please send me your free 192-page Buyers Stock Book and Catalog No. 56.

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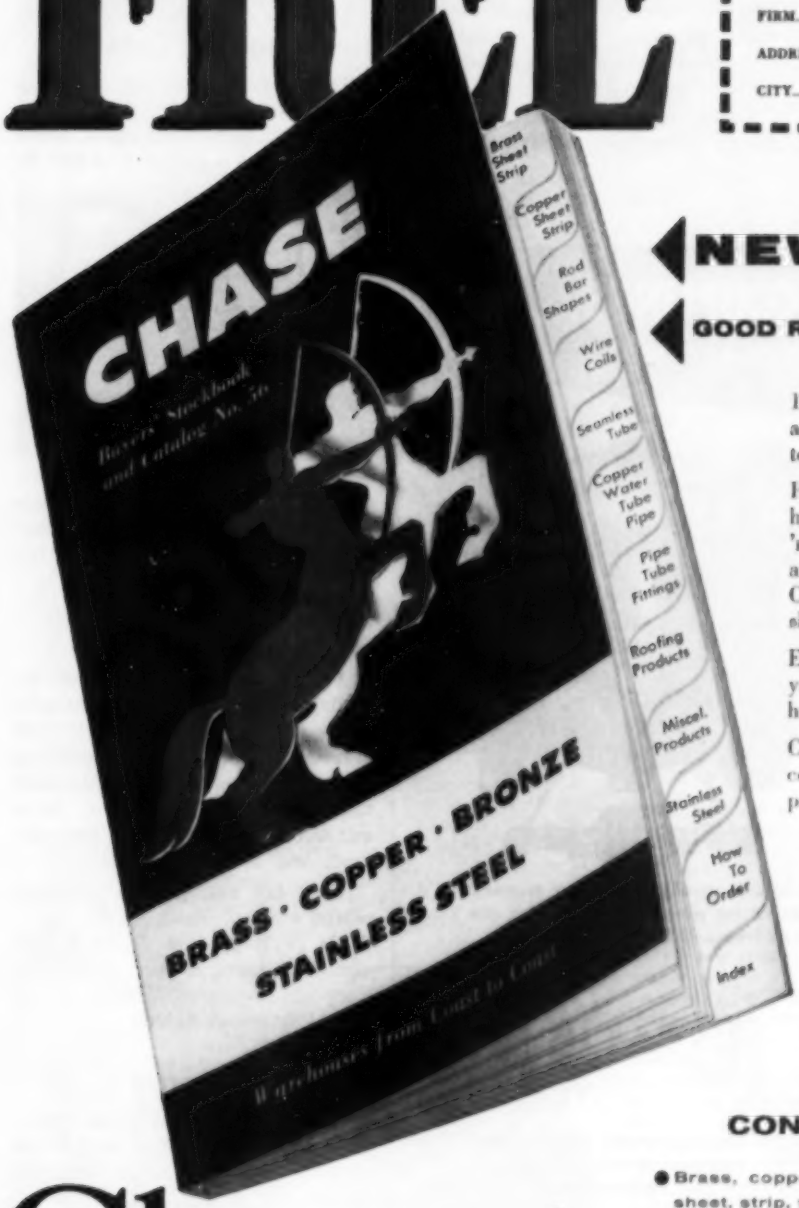

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Everything about it is designed to save you time, from its thumb-indexing to a headache-saving *how-to-order* section.

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NEW PRODUCTS and equipment

and cement system. The ball sheds liquids and dirt, and is not easily torn, abraded or deformed.

The connector withstands severe natural environments and is adaptable to any type splice, tap, terminal, stirrup or hot line clamp. *Write*: Kaiser Aluminum & Chemical Corp., Kaiser Bldg., 1924 Broadway, Oakland 12, Calif. *Phone*: Twinoaks 3-4600

Heat Resistant Paint

Heat-Rem QD Black is for surfaces subjected to temperatures up to 600°F. It air dries to a tough, bright finish in less than 2 hours.

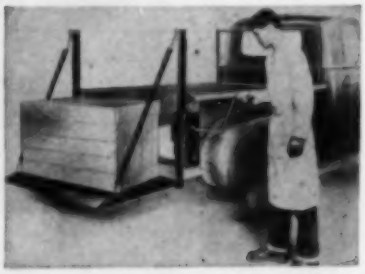
Maximum effectiveness is achieved without special baking. The paint resists extreme temperature variation, smoke, moisture, fumes, mild industrial acids and alkalis.

It is recommended for protecting steam lines, vats, separators, exhaust manifolds, stacks, tanks, ovens and heat lines. There is no objectionable odor during painting.

The paint can be applied by brush or spray. A gallon covers about 500 sq ft. *Write*: Speco Inc., 7308 Associate Ave., Cleveland 9, O. *Phone*: Atlantic 1-9520

Elevating Tail Gate

The Jiffy-Lift is an elevating tail gate for pickup and express truck bodies. The all steel, ramp type unit has a capacity of 600 lb.



It comes as a packaged unit which can be installed in less than 2 hours. Only six bolts are needed. *Write*: Mid West Body & Mfg., Paris, Ill.

Spline Nut

A tighter grip and smoother installation are assured by this self-locking spline nut. Type ND2398 serves: 1. As a blind mounting fastener for spots where attached nuts ease maintenance. 2. As a self-wrenching fastener for aircraft and industrial uses.

They are available in cadmium plated steel in 10-32, ¼-28, 5/16-24, ⅜-24, 7/16-20 and ½-20 thread sizes. *Write*: Elastic Stop Nut Corp. of America, Union, N. J. *Phone*: Murdock 6-6000

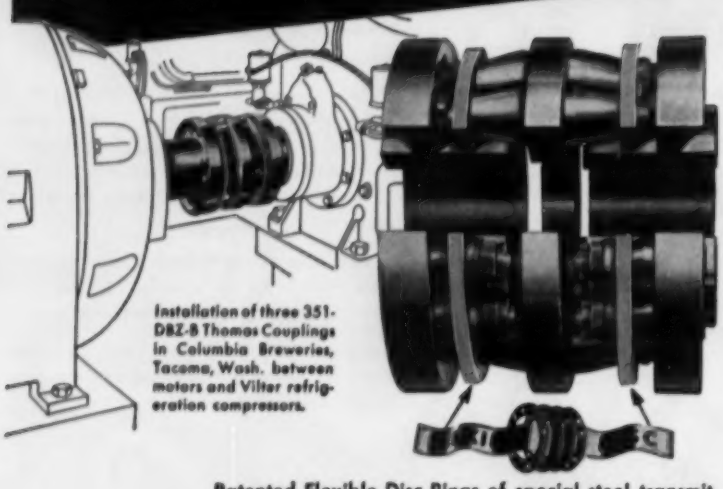
Acidproof Mortar

Corlok is a corrosion-proof mortar for the installation and maintenance of stack linings and acid tanks.

The mortar is based on potassium silicate and is essentially free from sodium silicate or other sodium compounds. It contains no fluoride setting agent.

The mortar withstands strong oxidizing acids—nitric, chromic and concentrated sulphuric. It resists sulphation and highly concentrated acids up to 1900°F. The product

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



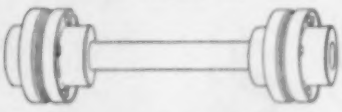
Installation of three 351-DBZ-8 Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



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THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Use WELDED STEEL for Greater Strength with Less Weight!

The 50-ton weldment above is one of fifty-five identical Press Beds produced for one manufacturer of heavy presses. This piece, and the parts and assemblies illustrated at the left, are typical of thousands of Steel-Weld Fabricated units produced and machined by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are you taking full advantage of the possibilities offered by welded steel components in your products? In the design of almost any type of heavy machinery there are pieces and sub-assemblies that can be produced more satisfactorily and more economically in welded steel —and with the additional advantages of less weight, greater rigidity and predictability. When you consider weldments, think of Mahon . . . because, you will find the Mahon organization a unique source for welded steel in any form . . . a source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where design skill and advanced fabricating techniques are supplemented by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or, better still, have a Mahon sales engineer call at your convenience.

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Engineers and Fabricators of Steel in Any Form for Any Purpose

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WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!

DIESEL ENGINE FRAME: Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

is noncorrosive to metals and will not react with lead or chrome-nickel alloys. *Write*: Pennsylvania Salt Mfg. Co., 3 Penn Center Plaza, Philadelphia 2, Pa. *Phone*: Locust 4-4700

Abrasive Saw

The Abr-A-Saw cuts 2-in. steel pipe in 6 seconds, 4-in. pipe in 10 seconds and 4-in. channel in 11 seconds.

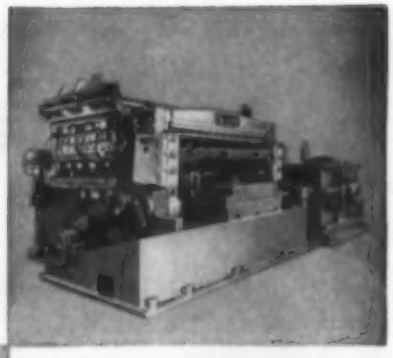
Lightweight design makes the saw portable. A foot operated, V-wedge holddown gives positive locking of the material to be cut. The unit is balanced to minimize operator fatigue. *Write*: Collins Machinery Corp., 5474 Alhambra Ave., Los Angeles 32, Calif. *Phone*: Capitol 5-6133

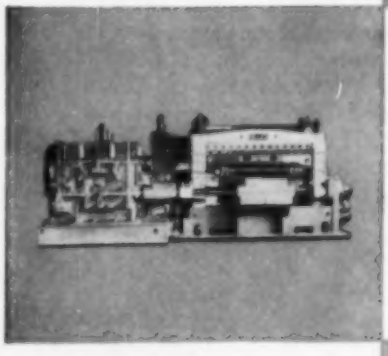
Powdered Metal Presses

Fill depth of the mechanical briquetting presses can be adjusted while they are operating. They feature central lubrication, a volume controlled filler shoe mechanism and a new core rod bracket. Capacities range from 8 to 40 tons.

The one-shot lubrication system reaches 21 points, including the

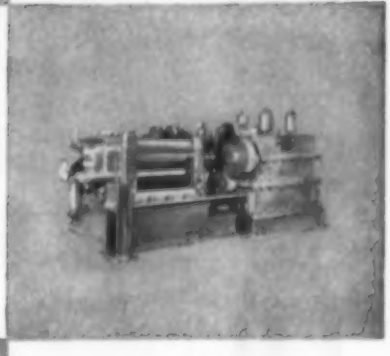
flexible design

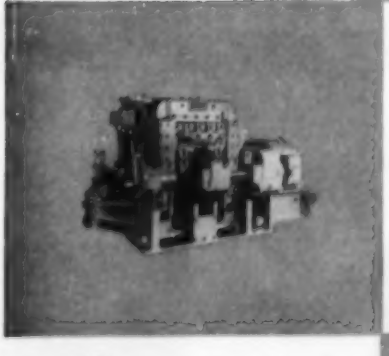




cutting accuracy

continuous feed





rugged construction

Automatic Shears by HALLDEN

"the shearing specialists"
THE HALLDEN MACHINE CO.
THOMASTON, CONNECTICUT

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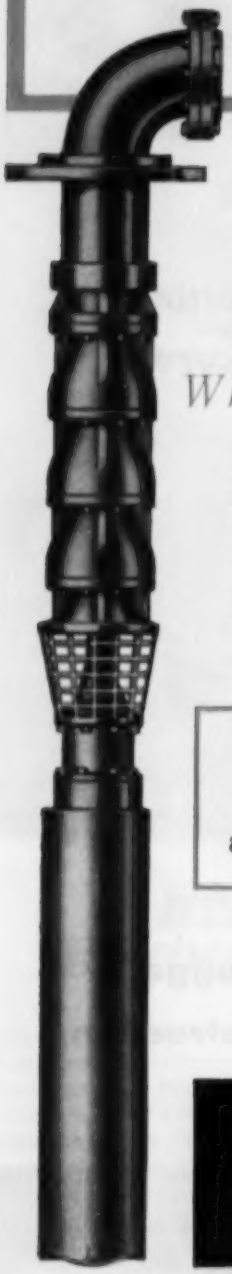
W. H. A. Robertson & Co., Ltd., Bedford, England (Ferrous & Non-Ferrous)

Verti-Line *Submersible*

BOOSTER PUMPS



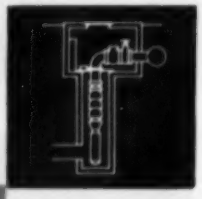
Layne & Bowler's half-a-century of experience in the design, engineering and manufacturing of vertical pumps, and the know-how of General Electric in the electric motor field *are now joined to produce the most advanced Submersible Booster Pumps made.* Sizes from 5 to 125 H.P.

Why Submersible Boosters?

For invisible, noiseless operation!
For safety—to people and equipment!
For dependability in any weather!
For maximum use of minimum space!
For maintenance-free performance, without adjustment or lubrication!

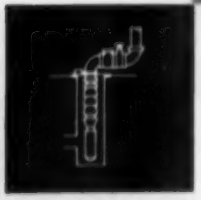
Some typical applications

pumping directly into distribution mains

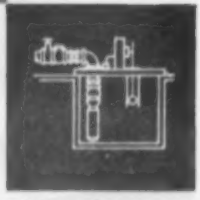


fire protection

sump operation



cooling tower service



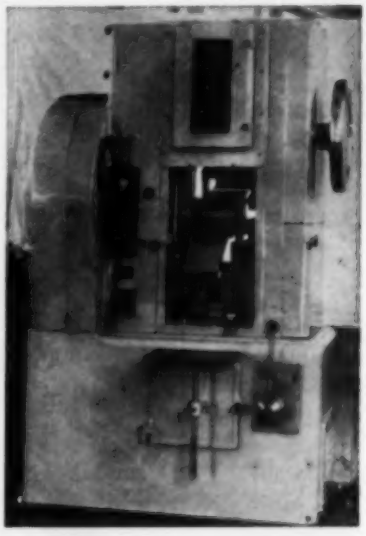
Send today for new bulletin containing description of pump and motor features, material specifications, selection tables and application data. Ask for bulletin J-76.

Verti-Line Pumps are the exclusive products of
LAYNE & BOWLER PUMP COMPANY
general offices and main plant
2943 VAIL AVENUE • LOS ANGELES 22, CALIFORNIA

NEW PRODUCTS and equipment

clutch, main bearings and all moving parts.

The filler mechanism delivers a predetermined amount of powder to the shoe—parts are made with a consistently uniform volume of material.

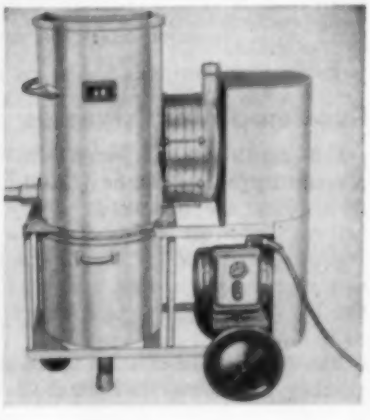


A new core rod bracket permits the use of short core pins attached to a stationary core rod. *Write*: Haller Inc., 684 Ann Arbor Rd., Plymouth, Mich. *Phone*: 3074

Vacuum Cleaner

Metallic litter, liquids, fabricated parts, dirt, dust, etc., are picked up by the heavy-duty industrial vacuum cleaner. The unit is compact; it is only 20½-in. wide and weighs but 330 lb.

A light tug pulls the unit through narrow aisles and over



Avoid unnecessary machining–

BY USING Edgewater

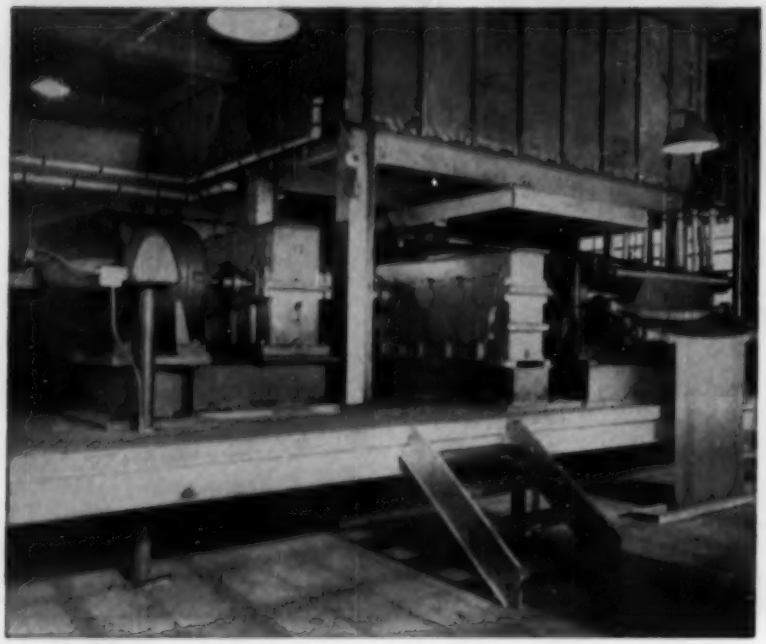
ROLLED STEEL RINGS

Rolled accurately to size and shape from solid blocks of steel, Edgewater Rolled Steel rings need a minimum of machining. The saving in time and material can be very substantial, especially when complex cross-section shapes are required. We will be glad to help you make designs that will gain for you the maximum advantages of the Edgewater process. Diameters, 5 inches to 145 inches.

SEND for free bulletin describing the Edgewater rolling of weldless steel rings.

Edgewater Steel Company
PITTSBURGH 30, PA.

Lee Rubber and Tire Corp. increases tire strength... speeds production with H & S speed reducers!



To satisfy demand for larger, heavy-duty tires, the tire industry found that Nylon cord tension must be increased. Lee Rubber and Tire Corp. solved this problem with the help of H & S engineering. At their Conshohocken, Pa. plant two new drive units consisting of a 125 H.P. motor, an H & S LD-3600 speed reducer and a special H & S seven shaft roll drive were installed.

Now 1200 to 1920 strands of Nylon pass through the tensioning cycle at a speed of 180 fpm. As the fabric leaves the "hold back roll" run at a constant speed, it passes through a temperature of 400°F for proper heat treating. H & S powered "pull up rolls" can exert a tension from 0 to 20,000 lbs. (Older drives were limited to a tension of approximately 1500 lbs.)

The result—greatly increased tension capacity enables the Lee Rubber and Tire Corp. to "set" the Nylon cords limiting growth in tire use to 2 or 2½%. (Formerly cord growth amounted to as much as 14%). Improved tire quality and faster production were achieved.

If you have a power transmission problem, won't you let us help you? Our diversified lines assure our unbiased recommendation. Contact your H & S representative or write us today.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

Send note on Company Letterhead for complete H & S Catalog

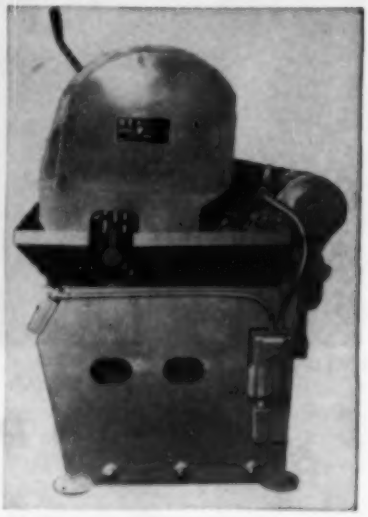
NEW PRODUCTS and equipment

rough floors. Model 300 has a 3-hp motor; model 501 uses a 5-hp motor. *Write*: Invincible Vacuum Cleaner Mfg. Co., Dover, O.

Abrasive Cutting

The No. 20 Speed-Cut is a machine for wet cutting only. With a 20-in. wheel, it can cut 4 in. pipe or rounds and 4 x 4 in. bars. Wheel speed is 1700 rpm.

The abrasive wheel travels over the material automatically. Travel is adjustable from 0 to 1½-in.



The machine has a circulating coolant pump, which has a separate motor and control and a settling tank with two baffles to filter out sediment. *Write*: Beaver Pipe Tools Inc., Warren, O. *Phone*: 2156-1

Nonferrous Cleaner

Compound 449 precleans nonferrous surfaces for plating and finishing operations. The water-soluble compound has a long bath life.

Hooding and exhaust systems are not needed. The compound is nontoxic and does not damage equipment and rack coatings.

Disposal problems are eliminated; the compound can be drained into a sewer. There are no fire hazards. *Write*: Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich. *Phone*: Texas 4-2500

No. 17 Billet Shear. Capacity, 10" rounds or 9" squares, 6 strokes per minute.

a "Buffalo" billet shear did it all in 10 minutes!

You're looking at a hundred 7" square billets readied for forging in just ten minutes by a "Buffalo" No. 15 Billet Shear with automatic feed table and back gage. This is just a sample of the high output of "Buffalo" Billet Shears in the nation's leading shops.

And note the clean, square faces of each cut. There's no smearing to conceal porosity, as with burning or sawing. The shear penetrates only $\frac{3}{16}$", localizing a neat, accurate vertical fracture. Divisions are uniform in dimensions and weight. Your quality keeps up with your speed!

Write for Bulletin 3295-C for all details.

"Buffalo" Billet Shears are built in 11 sizes to handle *your* size rounds, squares or flats. The smallest one shears thirty 2¼" rounds per minute; the largest, six 10" rounds per minute. Rigid arc-welded steel plate frames —"power" lubrication—air operated clutches, counterbalance and hold-down—are some of the "Q" Factors* that assure you years of service with practically no maintenance.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

Machine Tool Division

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

NEW literature

Write directly to the company for a copy

Fasteners

Bulletin CL-356, 12 pages, describes self-clinching fasteners for thin steel, brass, copper and aluminum sheets. Penn Engineering & Mfg. Co., Doylestown, Pa.

Grinding Mill

Bulletin 42-A, 8 pages, describes an electronic device for regulating the flow of feed material to continuous grinding or pulverizing mills. Hardinge Co. Inc., York, Pa.

Drill Catalog

High speed steel, carbon steel and carbide drills, reamers and countersinks are listed in catalog H-4. Chicago Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10, Ill.

Winch Catalog

A catalog lists the uses and ratings of truck mounted and stationary winches with capacities from 7000 to 100,000 lb. Customer Service Department, Gar Wood Industries Inc., Wayne, Mich.

Wire Rope Slings

Cable laid slings are featured in a 4-page bulletin, DH-532A. Wire Rope Sling Department, American Chain & Cable Co. Inc., Wilkes-Barre, Pa.

V-Belts

A series of five bulletins tells how to diagnose V-belt drive problems. Advertising & Sales Promotion Department, Worthington Corp., Harrison, N. J.

Water Filters

Pressure sand and gravel filters are covered in bulletin WC-107A, 12 pages. Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.

Industrial Floors

Methods for prolonging the life of floors with steel floor armor are given in a 12-page manual. Klemp Metal Grating Corp., 6615 S. Melvina Ave., Chicago 38, Ill.

Nickel Tubing

Catalog 12, 20 pages, gives handbook information on nickel and nickel alloy tubing. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Fastener Data Card

This information on screws up to 2½-in. in diameter includes steel analysis, head marking, tensile strength and hardness. Cleveland Cap Screw Co., Box 579, 2917 E. 79th St., Cleveland 4, O.

Conveyor Idler

Bulletin 2-72, 12 pages, contains design and application data on a cable suspension idler for belt conveyors. Joy Mfg. Co., 307 Oliver Bldg., Pittsburgh 22, Pa.

Index Tables

Catalog 301, 24 pages, depicts high speed precision indexing tables for large volume production. Ferguson Machine & Tool Co., P. O. Box 5841, St. Louis 21, Mo.

Corrugated Boxes

A 24-page booklet tells how to seal corrugated shipping boxes. Prepackaging is covered in a 32-page booklet. Hinde & Dauch Paper Co., Sandusky, O.

Fiber Containers

Use of lightweight, vulcanized fiber containers in material handling is shown in a 12-page bulletin contain-

Here is an IMPORTANT conveyor message for the metalworking industry

Write today for complete information.

MAY-FRAN ENGINEERING, INC.
1725 Clarkstone Road Cleveland 12, Ohio

NEW LITERATURE

ing six case histories. National Vulcanized Fibre Co., 1056 Beech St., Wilmington 99, Del.

Knitted Alloy Wire

Bulletin A-1, 8 pages, gives uses for knitted stainless steel and nickel alloy wire. Alloy Metal Wire Division, H. K. Porter Company Inc., Prospect Park, Pa.

Carbide Tools

A 4-page bulletin reports on a sintered carbide for general purpose, heavy duty work. Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.

Limit Switches

Bulletin 356, 4 pages, describes 19 contact arrangements available with seven machine tool limit switches. R. B. Denison Mfg. Co., 102 St. Clair Ave. N. W., Cleveland 13, O.

Air Gage

Catalog 56D, 32 pages, describes a direct-reading air gage with a guaranteed linear scale. Federal Products Corp., 1144 Eddy St., Providence 1, R. I.

Aluminum Coated Wire

Uses and advantages of products made with aluminized wire are presented in bulletin DH-537, 6 pages. Page Steel & Wire Rope Division, American Chain & Cable Co. Inc., Monessen, Pa.

Smoke Recorder

Details of a smoke density indicator system are presented in bulletin CM-22, 4 pages. Department CN-4, Electronics Corp. of America, 718 Beacon St., Boston 15, Mass.

Blast Cleaning

Abrasive blast cleaning of shell molded castings is covered in a booklet containing three case histories. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Cored Forgings

Advantages of nonferrous cored forgings are presented in 6-page bulletin AB-1001. Aviation Division, Weatherhead Co., Antwerp, O.

Welder Control

Bulletin 338, 6 pages, describes a tube-type control which counts cycles of power line frequency to control the welder sequence. Public Relations Department L-10, Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill.

Perforated Metals

A 6-page bulletin illustrates industrial and decorative perforated metals. It lists sheet sizes, types, gages and percentages of open areas. Harrington & King Perforating Co. Inc., 5627 Fillmore St., Chicago 44, Ill.

Foundry Equipment

A complete line of sand handling, mold handling and molding equipment is listed in 56-page bulletin 56. Newaygo Engineering Co., Newago, Mich.

Screw Machines

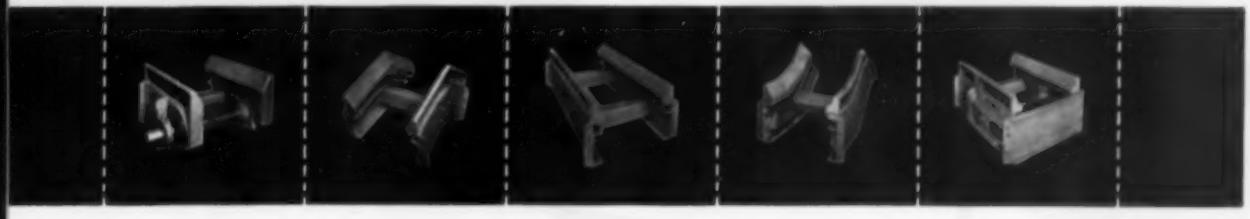
A 16-page bulletin depicts the latest design and production advances in single spindle, automatic bar machines. Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich.

Wire Baskets

Bulletin WB-501, 2 pages, gives specifications of wire baskets from 18 x 10 x 3 in. to 24 x 14 x 12 in. Chas. Wm. Doepke Mfg. Co. Inc., 8909 Blue Ash Rd., Rossmoyne, O

Cast Gears

Molybdenum alloys which permit reduction in size and weight of cast steel gears are discussed in a 4-page booklet. Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y



NOW YOU CAN ASSEMBLE YOUR OWN "CUSTOMIZED" CONVEYORS FROM PRE-FABRICATED STANDARD SECTIONS.

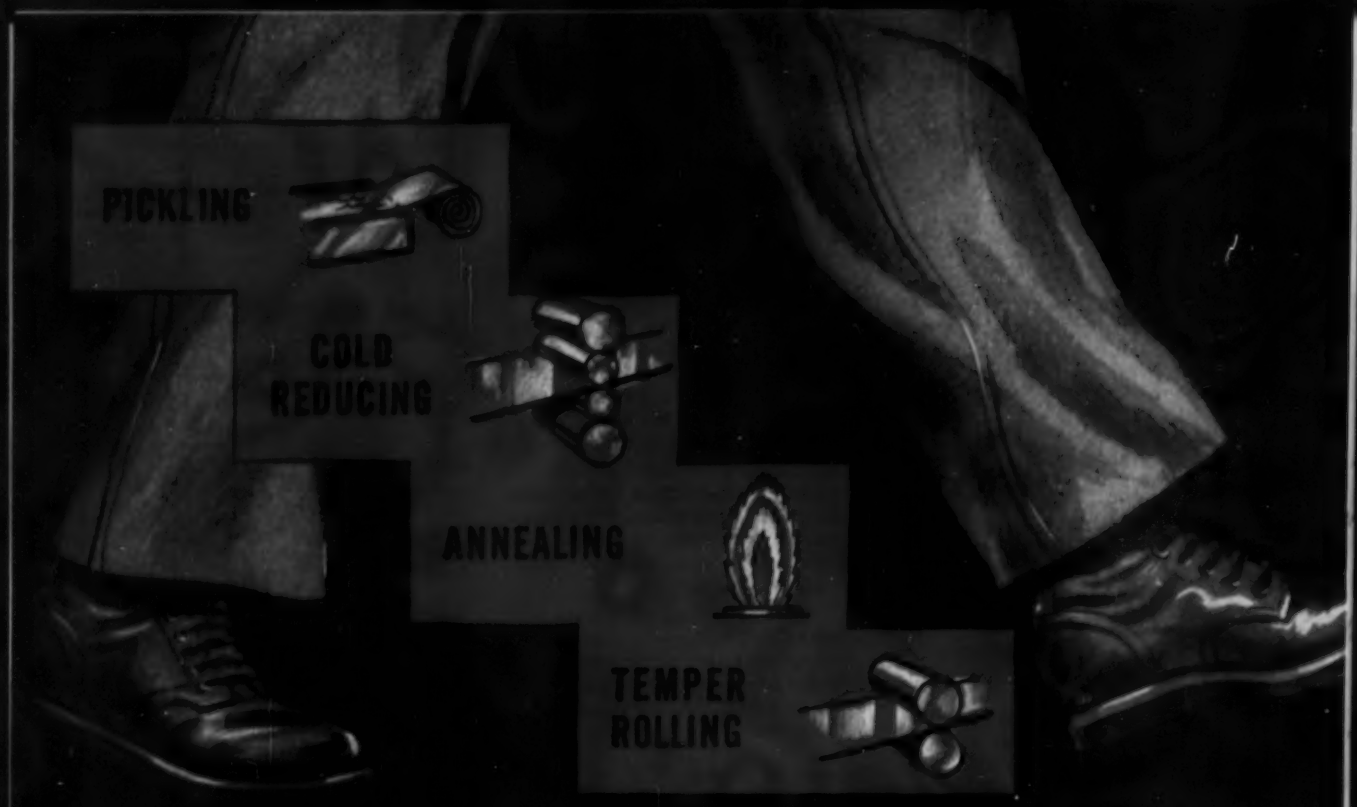
If your plant produces stampings, formed metal parts, castings or forgings . . . if you have a byproduct such as automotive scrap, chips and turnings . . . the MAY-FRAN conveyor standardization program will provide your company with savings never before possible.

Through standardization, MAY-FRAN now makes it possible to assemble individual components into virtually any type of conveyor to handle a wide range of products or materials. Straight sections . . . concave or convex sections . . . take-up charge sections and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

Even after they are installed, MAY-FRAN conveyors can be dis-assembled and re-assembled in other plant locations . . . to handle other products. Standardized conveyors can be lengthened, shortened or modified in almost any way . . . and at minimum cost.

Pre-fabricated conveyor sections can be furnished rapidly and inexpensively. The individual components provide users with the ultimate in flexibility. MAY-FRAN hinged-steel conveyor belting is used on the Standardized units. Belting is available in widths from 6 inches to 6 feet in any length. Solid and perforated links are available in pitch lengths from 2½ to 9 inches.

MAY-FRAN . . . a name long recognized in the materials handling field . . . is first again with standardized components for your customized installations.



QUALITY CONTROL

Every Step of the Way

Rigid quality control *every step of the way* is the Follansbee way of producing cold rolled strip that will meet your most *exacting* specifications—and give you a better product. At Follansbee, quality is in the hands of experienced and skilled craftsmen who take pride in delivering the best cold rolled strip in the industry.

See your Follansbee representative. He can offer you the kind of service you need—plus Follansbee quality.

Our Careful Quality Control Will Make YOUR Product Better

FOLLANSBEE

STEEL CORPORATION

FOLLANSBEE, WEST VIRGINIA

Cold Rolled Strip • Seamless Terne Roll Roofing • Polished Blue Sheets and Coils

Sales Offices in Principal Cities

STEEL

July 16, 1956

Market Outlook

YOU can begin to see the size of a steel price increase that's expected to ensue from a new contract between the steelworkers and the steel industry.

It's around 10 per cent.

BASE PRICES RAISED— Steel producers still operating (many are smaller companies) are raising base prices to cover the amount they think their costs will rise. In making these increases, the companies tried to be as accurate as possible. If they raise prices more than the industry eventually does, they risk being called gougers. If they don't raise prices enough, they will lose money, for most of those operating are to make wage increases retroactive to July 1.

THE RANGE— Steel price increases have ranged from $5 to $80 a ton, depending on the kind of product. The higher amount applies to stainless steel. Most of the increases fall in the $8 to $10 range.

A Philadelphia distributor of merchant pipe advanced prices 10 per cent and told customers they will be given rebates if the increase is less than that at the mill level. If the mill increase is more than 10 per cent, the distributor will take the loss.

JUST A START— The price increases made thus far account for only a small proportion of STEEL's arithmetical price composite on finished steel. Their effect in the week ended July 15 was a $1.14 increase, which pushed the composite to $130.32 a net ton. Increase since the steelworkers' strike started is $1.34.

An increase averaging 10 per cent throughout the steel industry would mean prices will top out at $12.90 above the prestrike level.

After the contract granted last summer to the steelworkers, STEEL's arithmetical price composite on finished steel climbed $6.14 a net ton, or 5.1 per cent.

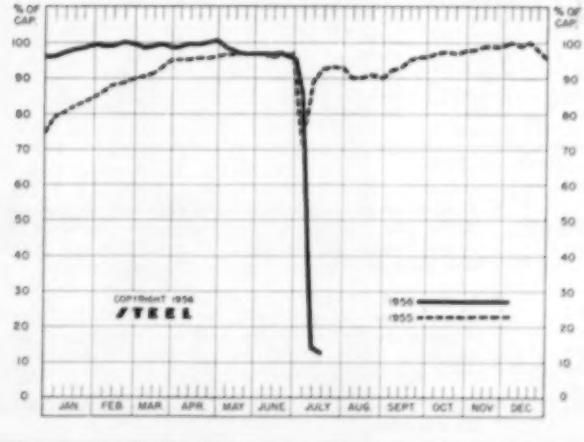
The price increases stemming from last summer's labor negotiations and the increases made in the last week or two applied to base prices. Between July, 1955, and July, 1956, prices continued to edge upward—not only in base quotations but also in extras. STEEL's arithmetical price composite (computed on base prices) rose $1.57 a ton in that period, while steel price averages of the U. S. Bureau of Labor Statistics climbed $2.75. (The BLS covers extras as well as base prices.)

PRODUCTION— The steel companies still operating kept 12.5 per cent of the nation's steelmaking capacity busy in the week ended July 15. The preceding week's rate was 14 per cent. A 12.5 per cent rate yields only 307,736 net tons of steel for ingots and castings.

FLEETING— The steel strike has just about eliminated the possibility of a new high record in steel ingot production this year. The first six months were a record half. Ingot production then was approximately 62,450,000 net tons. At an annual rate this was 124.9 million tons. The record year was 1955, with 117 million tons.

To equal the 1955 record, steel production would have to be resumed in earnest this week and continue the rest of the year at the same fast pace of the first half (97.3 per cent of capacity).

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended July 15	Change	Same Week 1955	Same Week 1954
Pittsburgh	2.5	0	92.5	63.5
Chicago	6	0*	96.5	70
Mid-Atlantic	9	0	96	59
Youngstown	5	0*	98	64
Wheeling	56	0	94.5	75
Cleveland	0	0	100.5	66.5
Buffalo	0	0	105	61
Birmingham	3.5	+ 1	93.5	75
New England	8	— 2	80	48
Cincinnati	66	— 3.5	87	49.5
St. Louis	95.5	+ 2	92	55.5
Detroit	15.5	0	88	53.5
Western	30	— 3	109	79
National Rate	12.5	— 1.5	93	65

INGOT PRODUCTION‡

	Week Ended July 15	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	19.4†	18.8	143.1	137.1
NET TONS (In thousands)	312	302	2,299	2,202

*Change from preceding week's revised rate †Estimated. ‡Amer. Iron & Steel Institute Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954

Metalworking Outlook—p. 75 Technical Outlook—p. 131

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	July 10 1956	July 3 1956	Month Ago	June Average
(1947-1949=100)	158.3	158.2	158.2	158.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	4.217	Strip, C.R., Carbon	5.329
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.066
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.887	Pipe, Line (100 ft)	170.028
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.360	Casing, Oil Well, Alloy (100 ft)	256.030
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	41.530
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.880	Tubing, Mechanical, Carbon (100 ft)	21.360
Bars, H.R., Alloy	0.475	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 305 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	9.333
Bars, H.R., Carbon	5.550	Tin Plate, Electrolytic, 0.25 lb	8.033
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	7.133
Bars, C.F., Carbon	9.950	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.375	Wire, Drawn, Stainless, 430 (lb)	0.590
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.537
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.590		

STEEL's FINISHED STEEL PRICE INDEX*

	July 11 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	210.45	210.45	210.45	207.63	171.92
Index in cents per lb	5.701	5.701	5.701	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$130.32	$129.18	$128.98	$126.64	$106.32
No. 2 Fdry Pig Iron, GT	60.84	60.56	60.27	58.90	52.54
Basic Pig Iron, GT	59.96	59.80	59.80	58.49	52.16
Malleable Pig Iron, GT	61.45	61.27	61.27	59.77	53.27
Steelmaking Scrap, GT	45.50	45.83	46.00	38.67	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composites STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 11 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.65	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.90	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.60	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.60	3.65
Shapes, deld., Philadelphia	5.09	5.09	5.09	4.88	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.50	3.70
Plates, Chicago	4.50	4.50	4.50	4.50	3.70
Plates, Conshohocken, Pa.	4.50	4.50	4.50	4.50	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.325	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.325	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	5.325	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	5.325	4.35
Sheets, C.R., Detroit	5.325	5.425	5.325-5.425	5.325-5.425	5.325	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.85	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.325	3.75-4.80
Strip, H.R., Chicago	4.325	4.325	4.325	4.325	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	6.317	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	6.45-6.55	4.90
Strip, C. R., Detroit	6.35	6.35	6.35	5.85-6.55	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	6.25	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$84.50	$84.50	$84.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.375	5.375	5.375	5.025	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$62.25	$61.00	$61.00	$59.50	$53.00
Basic, Valley	60.00	60.00	60.00	58.50	52.00
Basic, deld. Phila.	63.76	63.76	63.76	62.16	56.49
No. 2 Fdry, Neville Island, Pa.	63.00	60.50	60.50	59.00	52.50
No. 2 Fdry, Chicago	60.50	60.50	60.50	59.00	52.50
No. 2 Fdry, deld. Phila.	64.26	64.26	64.26	62.66	56.99
No. 2 Fdry, Birm.	57.00	57.00	55.00	54.50	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	62.70	55.33
Malleable, Valley	60.50	60.50	60.50	59.00	52.50
Malleable, Chicago	60.50	60.50	60.50	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$43.50	$44.50	$44.50	$39.50	$45.00
No. 1 Heavy Melt, E. Pa.	47.00	47.00	47.50	39.50	43.50
No. 1 Heavy Melt, Chicago	46.00	46.00	46.00	37.00	43.50
No. 1 Heavy Melt, Valley	44.50	44.50	49.50	38.50	46.00
No. 1 Heavy Melt, Cleve.	42.50	42.50	47.50	35.00	44.00
No. 1 Heavy Melt, Buffalo	42.50	42.50	45.50	34.50	44.00
Rails, Rerolling, Chicago	67.50	66.50	69.50	57.00	52.50
No. 1 Cast, Chicago	45.50	45.50	45.50	43.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50

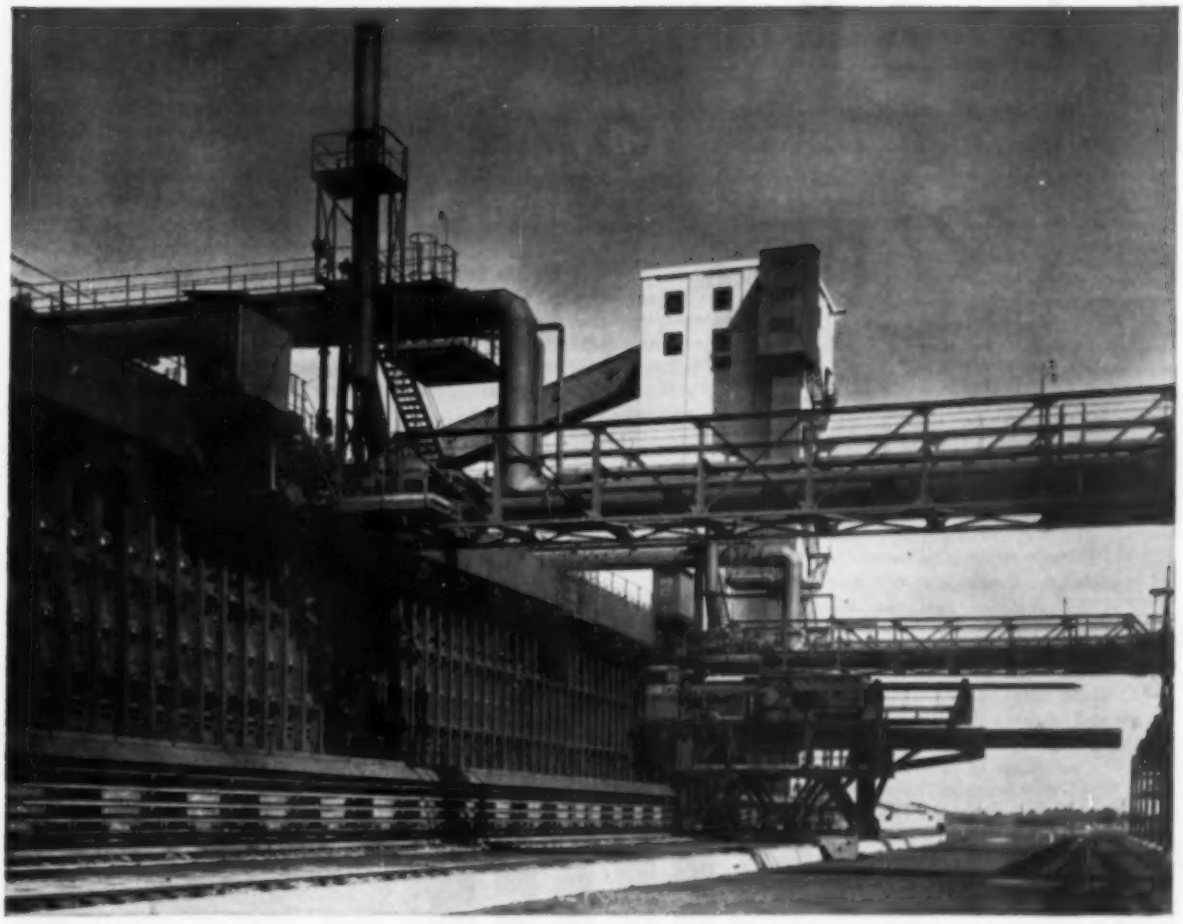
Daily Nonferrous Price Record

	July 11 Price	Last Change	Previous Price	June Avg.	May Avg.	July 1955 Avg.
Copper	37.50-40.00	July 12, 1956	37.50-46.00	43.000	45.696	36.000
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	14.800
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.500	12.250
Tin	94.875	July 11, 1956	95.50	94.611	97.024	97.045
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	25.90	Mar. 29, 1956	24.40-25.90	25.900	25.900	23.200
Magnesium	33.75	Apr. 16, 1956	32.50	33.750	33.750	28.500

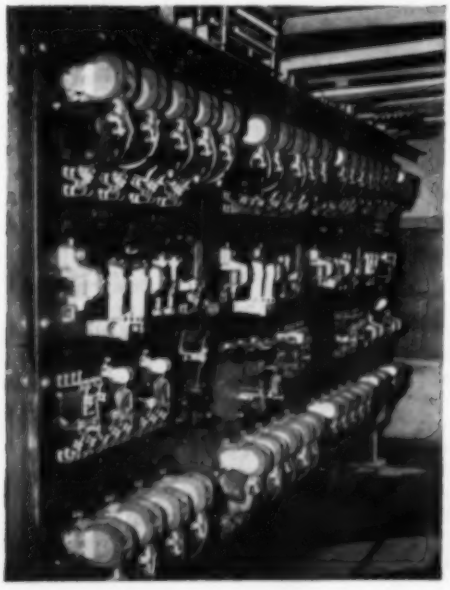
Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

What You Can Use the Market Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



Giant pusher for 76 coke ovens is CLARK CONTROLLED



Coke is discharged from this battery of 76 ovens—almost 300 feet long—at the rate of 58 tons per hour. The enormous Clark-controlled pusher moves from oven to oven on a regular schedule, emptying each as it becomes ready . . . Designed and built by the Wilputte Coke Oven Division of Allied Chemical and Dye Corporation of New York, the 300,000 pound pusher depends on Clark apparatus for its precise, dependable operation. The six separate motors, totalling 175 HP, are controlled by a Clark Bulletin 9300 Coke Pusher Control. The special Clark Control Panel is shown at the left.

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Nonferrous Metals

Aluminum shipments will show 10 per cent improvement this year over 1955, says Commerce Secretary Weeks. Industry wage negotiations await outcome of steel talks

Nonferrous Metal Prices, Pages 184 & 185

ALUMINUM shipments (ingot and mill products) will show "some seasonal decline and easing in the third quarter," says Secretary of Commerce Sinclair Weeks, following a survey by his department.

"But," says the secretary, "shipments should increase in the fourth quarter and result in a record year . . . at least 10 per cent above 1955."

Meanwhile—Wage negotiations in the aluminum industry appear dormant. The CIO steelworkers union representatives bargaining with the Aluminum Co. of America seem to be waiting for a break in the steel negotiations. The aluminum talks can go one of two ways: 1. If steel talks break down altogether, the union could turn its demands to the aluminum industry in an attempt to get its wage package through at least one industry. 2. The aluminum union team may postpone any serious talks with Alcoa and the other primary producers until after the steel strike is settled.

Reynolds Metals Co. is negotiating with Massena, N. Y., with an eye to building additional primary aluminum ingot capacity in this area. It would like to find a fabricator who would be willing to set up shop in Massena so that the aluminum could be sold in the molten state.

Copper Price Breaks

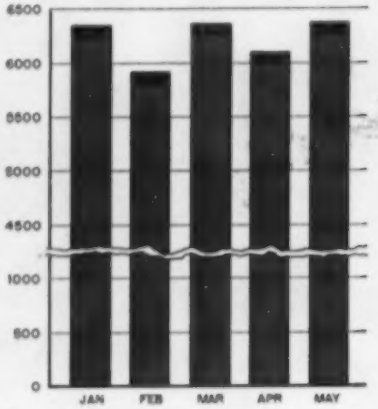
The big break in the copper price came last Tuesday (July 10) when Phelps Dodge Corp. led the way to the 40-cent primary level. The big question now is whether the price will stick or prove to be just a brief stop on the way to a level more competitive with other metals. Custom smelters are still well below the primary price, which will continue to exert pressure on the Big Three for further reductions. By July 12, both Anaconda and Kennecott had moved to the lower level. Custom smelters held the line, making the price spread 37.50 to 40 cents a pound.

"Copper consuming industries are not expected to use as much copper in the second half as in the first," comments Mr. Weeks. "Strongly influenced by the automobile and residential construction industries, brass mills probably will produce at a reduced rate in the third quarter. Fourth quarter brass mill business will improve but will be less than in the fourth quarter of 1955."

Two-week vacation periods are further reducing demand from brass mills. Custom smelters, who had trouble selling copper at 40 cents, haven't had much better luck since they reduced the price. Primary producers are faced continually with postponements for delivery.

Magnesium Riding High

(Ingot production—net tons)



Source: Magnesium Association

Lead, Zinc Sales Stagger

A steel strike plus low automotive output has brought zinc sales to a virtual standstill. Orders are being deferred and it looks as though it will be a quiet market for the remainder of the month. One bright spot: Zinc sales for diecasting will help improve the market situation in early August even if a steel strike persists.

Stocks of slab zinc at the beginning of the steel strike stood at 70,025 tons, the highest level since April, 1955. The buildup occurred despite the fact that production, at 78,370 tons in June, was the lowest since October, 1954. In addition, the government took delivery of 15,085 tons for stockpile, the highest figure since February of last year. The government's take in July will be much larger unless an early settlement of the steelworkers' strike brings galvanizers back into the market. The one bright spot in the American Zinc Institute's figures is the increase in unfilled orders from 34,003 tons at the end of May to 45,921 tons at the beginning of July.

Lead sales are slow to moderate. Users are not eager to cover needs for the rest of this month and only a few orders were placed last week for August deliveries. Plant shutdowns for vacations are affecting sales, too.

Mag Production Strong

Magnesium ingot production totaled 6359 tons in May, reports the Magnesium Association (see chart). This is a 4.6 per cent increase over April. Shipments of wrought products reached a new high of 1231 tons, up 8 per cent over April. Says Jerry Singleton, executive secretary: "Primary production is running 50 per cent ahead of last year. It now appears that we will pass our previous best year (1954) when some 70,000 tons were produced." Industry capacity is rated at 75,000 tons.

Nickel Under Scrutiny

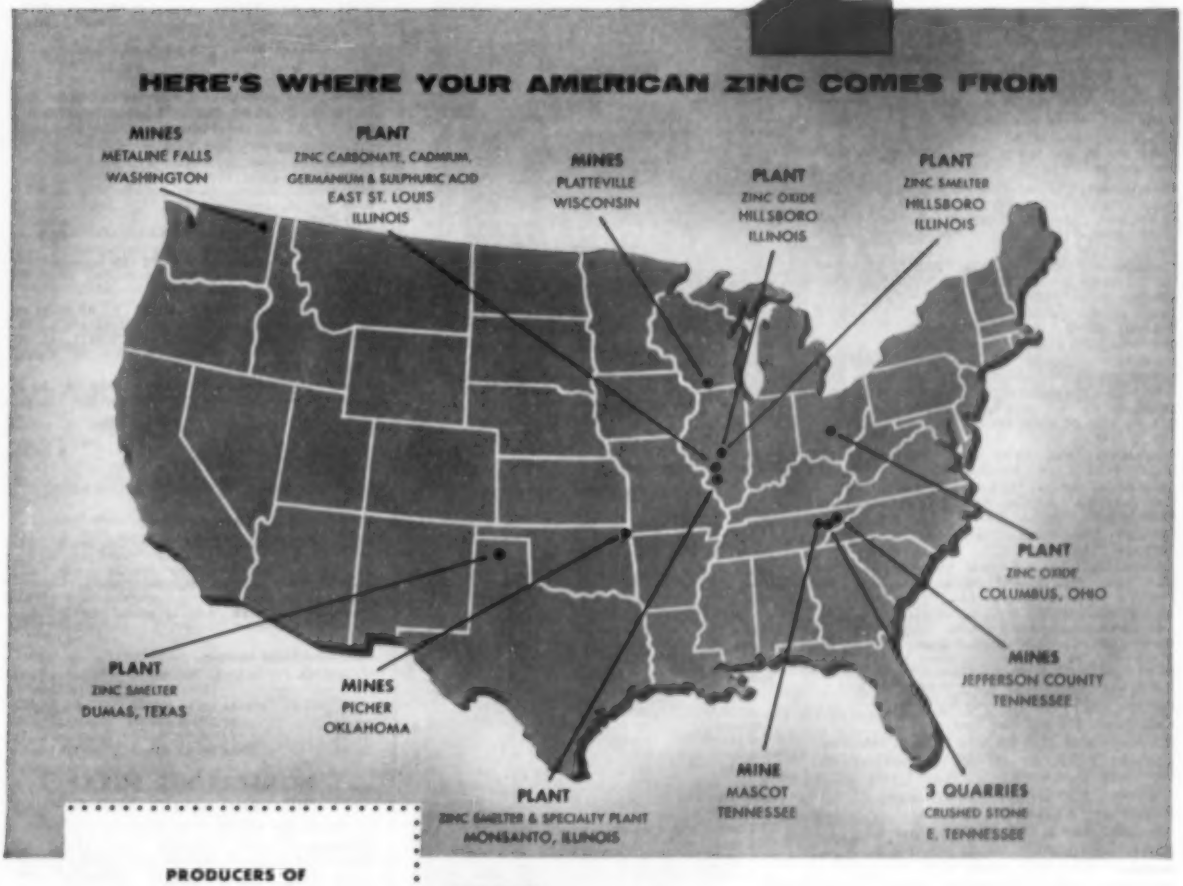
What causes the discrepancies between anticipated military nickel needs and actual consumption? R. C. Lanphier, deputy assistant secretary of defense, supply and logistics, told a Senate investigation committee: "Without quantitative controls on nickel distribution for all rated uses, we feel it is impossible to arrive at the exact causes of shortages and discrepancies. Such controls have been avoided in the interest of saving tremendous clerical manpower, both on the part of government and industry." Outlook: Congress may demand that the Defense department keep closer tabs on its military rated orders.

Market Memos

- There are growing indications that the price of nickel sold on the open market is beginning to show signs of weakening. Steel strikes coupled with low automotive demand are contributing factors.
- The various government agencies (GSA, ODM, Pentagon, etc.) have received a resolution from the Magnesium Association requesting that study be given to a plan for providing additional U. S. magnesium capacity.

American inc and its products

from A *to* Z



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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 132, 4% Cu, 1.5% Mg, 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.30; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 37.50 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99 +, cups or ingots, $11.50; rod $12.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 34.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.80; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.02.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $48-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.125 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 94.875; prompt, 94.75.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.80-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-28.25; No. 12 foundry alloy (No. 2 grade), 24.25-25.00; 5% silicon alloy, 0.60 Cu max, 25.75-26.50; 13 alloy, 0.60 Cu max, 25.75-26.50; 195 alloy, 26.25-27.00; 108 alloy, 24.75-25.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 24.25; grade 3, 23.50; grade 4, 23.00.

Brass Ingot: Red brass, No. 115, 35.50; tin bronze, No. 225, 48.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.75; No. 1 yellow No. 405, 30.75; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35¢; l.c.l., 45.98. Weatherproof, 30,000-lb lots, 43.78; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $12.60-$13.10; sheared mill plate, $10.00-$12.00; strip, $12.10-$12.60; wire, $9.00-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	62.4	67.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	68.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	58.9	55.7
1.063	53.6	51.6	...	53.8
1.125-1.500	51.6	49.7	55.1	53.8
Rolled				
1.563	50.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.126	39.0	43.8	...	...
0.125-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.5
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	46.0	38.7	43.9
0.037-0.030	42.3	46.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.5
2024-T4*	45.1	51.4
7075-T6*	52.9	60.6

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.80-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: A8A schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
¾	$17.45	3	$ 53.55
1	27.35	4	148.60
1¼	37.05	6	286.55
1½	44.30	8	401.10

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 160.00; .081 in., 75.00; .188 in., 66.50; .250-2.0 in., 65.50. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

Extruded Solid Shapes:

Factor	Com. Grade (FS)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
34-35	84.90-85.50	99.90-100.50

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.50-17.00; old sheets, 13.00-13.50; borings and turnings, 8.00-8.50; crankcases, 13.00-13.50; industrial castings, 13.00-13.50.

Copper and Brass: No. 1 heavy copper and wire, 28.50-29.00; No. 2 heavy copper and wire, 27.00-27.50; light copper, 24.50-25.00; No. 1 composition red brass, 23.50-24.00; No. 1 composition turnings, 22.50-23.00; yellow brass

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.19	42.65d	52.64	55.01	27.750	27.000	25.125
Low Brass, 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.125
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.64	33.125	32.875	32.375
Manganese Bronze	59.46	53.86	67.09	....	25.250	25.000	24.500
Muntz Metal	53.84	49.65	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.03	65.90	58.85	26.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.93g	72.49	....	35.625	35.375	17.813
Phos. Bronze, A, 5%	79.58	80.08	85.42	86.60	42.125	41.875	40.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

turnings, 13.00-13.50; new brass clippings, 22.50-23.00; light brass, 14.50-15.00; heavy yellow brass, 15.50-16.00; new brass rod ends, 20.50-21.00; auto radiators, unsweated, 16.00-16.50; cocks and faucets, 19.00-19.50; brass pipe, 18.00-18.50.

Lead: Heavy, 12.50-12.75; battery plates, 6.50-6.75; linotype and stereotype, 13.50-14.00; electrotype, 12.75-13.00; mixed babbitt, 14.50.

Monel: Clippings, 55.00-85.00; old sheets, 55.00-85.00; turnings, 60.00-70.00; rods, 55.00-85.00.

Nickel: Sheets and clips, 90.00-190.00; rolled anodes, 90.00-190.00; turnings, 80.00-150.00; rod ends, 90.00-190.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 3.00.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.50-19.00; 3003 clippings, 18.50-18.75; 6151 clippings, 18.50-18.75; 5052 clippings, 18.50-18.75; 2014 clippings, 17.50-18.25; 2017 clippings, 17.50-18.25; 2024 clippings, 17.50-18.25; mixed clippings, 17.25-17.50; old sheets 15.75-16.00; old cast, 15.75-16.00; clean old cable (free of steel), 17.50-18.50; borings and turnings, 15.25-17.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 45.00.

Copper and Brass: No. 1 heavy copper and wire, 32.50; No. 2 heavy copper and wire, 29.50; light copper, 27.25; refinery brass (60% copper) per dry copper content, 28.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 32.50; No. 2 heavy copper and wire, 29.50; light copper, 27.25; No. 1 composition borings, 25.50; No. 1 composition solids, 24.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 20.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 63.79; oval 62.92, 5000-10,000 lb; electrodeposited, 52.78; 2000-5000 lb lots; cast, 55.04-59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, 114.50; 200-499 lb, 113.00; 500-999 lb, 112.50; 1000 lb or more, 112.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 42.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 30.35; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 69.40; 100-600 lb, 61.10; 700-1900 lb, 58.60; 2000-5900 lb, 56.90; 10,000 lb or more, 55.70.

Stannous Chloride (anhydrous): Less than 25 lb, 165.90; 25 lb, 130.90; 100 lb, 115.90; 400 lb, 113.50; 5200-19,600 lb, 101.30; 20,000 lb or more, 89.10.

Stannous Sulphate: Less than 50 lb, 123.70; 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or more, 94.70.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRECISION is a most important element.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

6002-CH

Write today for Bulletin 1264-CH

CHANDLER PRODUCTS CORPORATION

1488 CHARDON ROAD • CLEVELAND 17, OHIO

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 187; to footnotes, page 189

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)
Detroit R7 .....$69.00
Houston 85 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Aliquippa,Pa. J5 .....$68.50
Bessemer,Pa. U5 .....68.50
Bridgeport,Conn. N19 ..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 .....78.00
Gary,Ind. U5 .....68.50
Johnstown,Pa. B2 .....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 .....74.50
Munhall,Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S.Chicago,Ill. R2, U5 ..68.50
S.Duquesne,Pa. U5 ....68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)
Aliquippa,Pa. J5 .....$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19 ..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3 ..97.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana,Calif. K1 .....94.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston 85 .....101.00
Johnstown,Pa. B2 .....84.50
Lackawanna,N.Y. B2 ..84.50
LosAngeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2, U5 .....84.50
S.Chicago W14 .....89.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 .....94.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 .....$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 .....96.00
Conshohocken,Pa. A3 ..111.00
Detroit R7 .....96.00
Fontana,Calif. K1 .....117.00
Gary,Ind. U5 .....96.00
Houston 85 .....105.00
Ind.Harbor,Ind. Y1 ....96.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2, U5.....96.00
S.Chicago W14 .....101.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....106.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2 .....103.50
S.Chicago W14 .....108.50
S.Duquesne,Pa. U5 ..103.50

SKELP
Aliquippa,Pa. J5 .....4.325
LoneStar,Tex. L6 .....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
Youngstown R3, U5 ...4.225

WIRE RODS
AlabamaCity,Ala. R2 ..5.375
Aliquippa,Pa. J5 .....5.375
Alton,Ill. L1 .....5.55
Buffalo W12 .....5.375
Cleveland A7 .....5.375
Donora,Pa. A7 .....5.375
Fairfield,Ala. T2 .....5.375
Houston 85 .....5.625
IndianaHarbor,Ind. Y1.5.375
Johnstown,Pa. B2 .....5.375
Joliet,Ill. A7 .....5.375
KansasCity,Mo. S5 ....5.625
Kokomo,Ind. C18 .....5.475
LosAngeles B3 .....6.175
Minnequa,Colo. C10 ...5.625
Monessen,Pa. P7 .....5.375
N.Tonawanda,N.Y. B11 5.375
Pittsburg,Calif. C11 ..6.025
Portsmouth,O. P12 ....5.725
Roebling,N.J. R5 .....5.475
S.Chicago,Ill. R2 .....5.375
SparrowsPoint,Md. B2..5.475
Sterling,Ill.(1) N15 ...5.375
Sterling,Ill. N15 .....5.475
Struthers,O. Y1 .....5.375
Worcester,Mass. A7 ..5.675

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 .....5.20
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston 85 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 .....4.65
KansasCity,Mo. S5 .....4.70
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.20
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....5.25
Phoenixville,Pa. P4 ....5.15
Portland,Oreg. O4 .....5.35
Seattle B3 .....5.35
S.Chicago W14 .....4.85
S.Chicago U5 .....4.60
S.SanFrancisco B3 .....5.25
Torrance,Calif. C11 ...5.30
Weirton,W.Va. W6 .....4.60

Wide Flange
Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 .....5.45
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes
Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....5.65
Houston 85 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 .....7.45
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston 85 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 .....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5 .....6.75
S.Chicago W14 .....7.00
S.SanFrancisco B3 .....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ..4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....5.35
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.20
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GraniteCity,Ill. G4 .....4.70
Harrisburg,Pa. P4 ....5.10
Houston 85 .....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ..4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.725
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5 .....4.50
S.Chicago W14 .....4.75
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 .....4.50
Youngstown R2, U5, Y1.4.50

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....6.35
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2..5.65

PLATES, Wrought Iron
Economy,Pa. B14 .....11.128

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 .....7.025
Conshohocken,Pa. A3 ..7.175
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1..7.425
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston 85 .....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5 .....6.725
S.Chicago W14 .....6.975
SparrowsPoint,Md. B2..6.725
Warren,O. R2 .....6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy
Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 ....6.30
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....6.30
Houston 85 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....7.00
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5 .....6.30
S.Chicago W14 .....6.55
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES
Cleveland J5 .....5.575
Conshohocken,Pa. A3 ...6.025
Harrisburg,Pa. P4 .....5.575
Ind.Harbor,Ind. I-2 ...5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron
Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ....4.65
Aliquippa,Pa.(9) J5 ....4.65
Alton,Ill. L1 .....4.85
Atlanta(9) A11 .....5.15
Bessemer,Ala.(9) T2 ...4.65
Birmingham C15 .....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo(9) R2 .....4.65
Canton,O.(9) R2 .....4.75
Clairton,Pa.(9) U5 .....4.65
Cleveland(9) R2 .....4.65
Ecorse,Mich.(9) G5 ....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala.(9) T2 ...4.65
Fairless,Pa.(9) U5 ....4.80
Fontana,Calif. K1 .....5.35
Gary,Ind.(9) U5 .....4.65
Houston(9) 85 .....4.90
Ind.Harbor,Ind.(9) I-2..4.65
Ind.Harbor,Ind. Y1 ....4.65
Johnstwn,Pa.(9) B2 ....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo.(9) S5 ..4.90
Lackawanna(9) B2 .....4.65
LosAngeles(9) B3 .....5.35
Massillon,O.(9) R2 ....4.75
Midland,Pa.(9) C18 ....4.65
Milton,Pa. M18 .....5.25
Minnequa,Colo. C10 .....5.10
Niles,Calif. P1 .....5.35
N.T'wanda,N.Y.(9) B11 4.65
Pittsburg,Calif.(9) C11..5.35
Pittsburgh(9) J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago W14 .....4.90
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5 ..4.65
S.SanFran.,Calif.(9) B3.5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif.(9) C11 .5.35
Warren,O.(9) R2 .....4.65
Weirton,W.Va.(9) W6 ...4.65
Youngstown(9) R2, U5..4.65

BARS, H.R. Leaded Alloy
Warren,O. C17 .....7.075

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 .....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fairless,Pa. U5 .....5.725
Fontana,Calif. K1 .....6.625
Gary,Ind. U5 .....5.575
Houston 85 .....5.825
Ind.Harbor,Ind. I-2, Y1.5.575
Johnstown,Pa. B2 .....5.575
KansasCity,Mo. S5 .....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago R2, U5 .....5.575
S.Chicago W14 .....5.825
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....6.075
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.80
Houston 85 .....7.05
Ind.Harb.,Ind. I-2, Y1..6.80
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 .....7.05
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....7.05
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES, H.R. Carbon
Bethlehem,Pa.(9) B2 ...4.80
Lackawanna(9) B2 .....4.65

BAR SIZE ANGLES, S. Shapes
Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....5.15
Fontana,Calif. K1 .....5.35
Joliet,Ill. P22 .....5.10
Niles,Calif. P1 .....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.65
Gary,Ind. U5 .....5.65
Houston 85 .....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 .....5.65

BARS, C.F. Leaded Alloy
Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 .....8.35
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
SpringCity,Pa. K3 .....8.30
Warren,O. C17 .....9.075

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....6.25
BeaverFalls,Pa. M12,R2 6.25
Buffalo B5 .....6.30
Camden,N.J. P13 .....6.70
Carnegie,Pa. C12 .....6.25
Chicago W18 .....6.25
Cleveland A7, C20 .....6.25
Detroit B5, P17 .....6.45
Detroit R7 .....6.25
Donora,Pa. A7 .....6.25
Elyria,O. W8 .....6.25
FranklinPark,Ill. N5 ...6.25
Gary,Ind. R2 .....6.25
GreenBay,Wis. F7 .....6.25
Hammond,Ind. L2, M13.6.25
Hartford,Conn. R2 .....6.75
Harvey,Ill. B5 .....6.25
LosAngeles(49) S30 ....7.70
LosAngeles R2 .....7.70
Mansfield,Mass. B5 ....6.80
Massillon,O. R2, R8 ....6.25
Midland,Pa. C18 .....6.25
Monaca,Pa. S17 .....6.25
Newark,N.J. W18 .....6.70
NewCastle,Pa.(17) B4 ..6.25
Pittsburgh J5 .....6.25
Plymouth,Mich. P5 ....6.50
Putnam,Conn. W18 .....6.80
Readville,Mass. C14 ....6.80
S.Chicago,Ill. W14 .....6.50
SpringCity,Pa. K3 .....6.70
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. W19 ..6.70
Youngstown F3, Y1 ....6.25

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 5.15

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.60
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 .....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis. F7 .....7.425
Hammond,Ind. L2, M13 7.425
Hartford Conn. R2 .....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5 ..7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P5 ....7.625
S.Chicago W14 .....7.675
SpringCity,Pa. K3 .....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.925
Waukegan,Ill. A7 .....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 .....4.65
Atlanta A11 .....5.15
Birmingham C15 .....5.15
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
Fairless,Pa. U5 .....4.80
Fontana,Calif. K1 .....5.35
Ft.Worth,Tex.(42) T4 ..5.10
Gary,Ind. U5 .....4.65
Houston 85 .....4.90

Ind.Harbor,Ind. I-2, Y1 .4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. F22 .....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....5.25
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R3, U5 ....4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2..6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ...6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¼-1" B2 ...6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..5.10
Franklin,Pa.(3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa. (S.R.)B14 12.305
Economy,Pa. (D.R.)B14 15.301
Economy (Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.775
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fairless,Pa. U5 .....4.375
Fontana,Calif. K1 ....5.125
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E8 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ....4.725
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.725
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.575
SparrowsPoint,Md. B2 ..4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R., (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.20
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1, U5 ....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
Fairless,Pa. U5 .....6.425
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.725
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
Fairless,Pa. U5 .....5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.025
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 .....6.025
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.925
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 .....5.925
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10....5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
Fairless,Pa. U5 .....7.925
Fontana,Calif. K1 ....9.075
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron
Middletown,O. A10 ....5.825

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.20	6.45
Canton,O. R2	6.10	6.35
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	*6.60*	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85†
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85†
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85†
GraniteCity,Ill. G4 .....6.65
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....6.35‡
MartinsFerry,O. W10 ..5.85†
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ...6.60*
Pittsburgh J5 .....5.85†
SparrowsPt.,Md. B2 ...5.85*
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.625

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....7.00
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R3 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.80
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R3 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key To Producers

A1 Acme Steel Co.
A2 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod., Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Harium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P13 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburg Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U8 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U9 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W3 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.525
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	*4.775*
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles (25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	4.85
SanFrancisco S7	5.06
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	*4.575*
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling,Ill.(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.80
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.95
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	*7.45*
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.925
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.70
Dearborn,Mich. D3	6.35
Detroit M1, P20	6.35
Detroit D2	*6.95*
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y-1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	6.70
NewHaven,Conn. D2	*7.30*
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y. (22) R4	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2 T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.00C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	...	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
NewYork W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.80	16.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	16.50	22.35
Harrison,N.J. C18	...	...	14.80	16.15	22.00
NewYork W3	...	...	14.80	16.15	22.00
Trenton,N.J. R5	...	...	14.80	16.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	16.15	22.00
Youngstown C8	...	...	15.15	16.50	22.35

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. B9, T5	6.25*
Worcester,Mass. A7	6.50*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	11.85
Vandergrift,Pa. U5	...	9.35	9.95	10.95	....
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.55	17.45	17.95	18.45	13.55**
Butler,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	..	14.85	15.85	17.45	17.95	....
Warren,O. R2	....	....	....	....	....	13.55**
	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, annealed, lengths, ¾-cent lower. ¶Coils, ¾-cent higher. **Cut

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fontana,Calif. K1	9.95	9.30	9.70
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.30	8.55	8.95
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	8.30	8.55	8.95
SparrowsPoint,Md. B2	9.05	9.30	9.70
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.23 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.55
Dravosburg,Pa. U5	9.60	9.55
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.55
Ind.Har. I-2, Y1	9.60	9.55
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.55
Yorkville,O. W10	9.60	9.55

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40

Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Warren,O. R2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.60
Aliquippa,Pa. J5	8.60
Alton,Ill. L1	8.775
Atlanta A11	8.80
Bartonville,Ill. K4	8.70
Buffalo W12	8.60
Chicago W13	8.60
Cleveland A7	8.60
Crawfordsville,Ind. M8	8.70
Donora,Pa. A7	8.60
Duluth,Minn. A7	8.60
Fairfield,Ala. T2	8.60
Fostoria,O.(24) S1	8.80
Houston S5	8.85
Jacksonville,Fla. M8	8.95
Johnstown,Pa. B2	8.60
Joliet,Ill. A7	8.60
KansasCity,Mo. S5	8.85
Kokomo,Ind. C16	*7.20*
LosAngeles B3	7.55
Minnequa,Colo. C10	8.85
Monessen,Pa. P7	8.60
Newark 6-8 ga. I-1	8.90
N.Tonawanda B11	8.60
Palmer,Mass. W12	8.90
Pittsburg,Calif. C11	7.55
Portsmouth,O. P12	*7.10*
Rankin,Pa. A7	8.60
S.Chicago,Ill. R2	8.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	8.70
Sterling,Ill.(1) N15	8.60
Sterling,Ill. N15	8.70
Struthers,O. Y1	8.60
Waukegan,Ill. A7	8.60
Worcester,Mass. A7	8.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P7, P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	*8.60*
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P7, P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	*8.30*
Roebling,N.J. R5	7.90
S.ChicagoIll. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8"Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	*11.05*
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	*11.50*
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P7, P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	*11.35*
Roebling,N.J. R5	10.55
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	....14.15
Monessen,Pa. P18	.....14.20
Roebling,N.J. R5	.....14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....9.80
Baltimore T6	.....9.80
Boston T6	.....9.80
Buffalo W12	.....9.50
Cleveland A7	.....9.50
Crawfordsville,Ind. M8	..9.50
Dover,O. G6	.....9.50
Fostoria,O. S1	.....9.50
FranklinPark,Ill. T6	...9.60
Kokomo,Ind. C16	.....9.50
Massillon,O. R8	.....9.50
Milwaukee C23	.....9.70
Monessen,Pa. P7, P16	..9.80
Pawtucket,R.I. N8	....9.80
Riverdale,Ill. A1	.....9.60
Rome,N.Y. R6	.....9.50
Trenton,N.J. R5	.....9.80
Worcester A7, T6, W12	.9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(20) M8	..163
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	*160*
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	..$9.05
Wheeling,W.Va. W10	...9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(20) M8	..163
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	*160*
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.45
Bartonville,Ill. K4	.....9.45
Buffalo W12	.....9.45
Crawfordsville,Ind. M8	..9.55
Donora,Pa. A7	.....9.45
Duluth,Minn. A7	.....9.45
Jacksonville,Fla. M8	..10.01
Johnstown,Pa. B2	.....9.45
Joliet,Ill. A7	.....9.45
Kokomo,Ind. C16	.....9.55
LosAngeles B3	.....10.24
Minnequa,Colo. C10	....9.60
Pittsburg,Calif. C11	....10.23
S.Chicago,Ill. R2	.....9.45
SparrowsPt.,Md. B2	....9.55
Sterling,Ill. N15	.....9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	..$9.75
Bartonville,Ill. K4	.....9.75
Buffalo W12	.....9.75
Crawfordsville,Ind. M8	..9.85
Donora,Pa. A7	.....9.75
Duluth,Minn. A7	.....9.75
Jacksonville,Fla. M8	..10.31
Johnstown,Pa. B2	.....9.75
Joliet,Ill. A7	.....9.75
Kokomo,Ind. C16	.....9.85
LosAngeles B3	.....10.55
Minnequa,Colo. C10	....9.90
Pittsburg,Calif. C11	....10.55
S.Chicago,Ill. R2	.....9.75
SparrowsPt.,Md. B2	....9.85
Sterling,Ill. N15	.....9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	..$9.80
Bartonville,Ill. K4	....9.80
Buffalo W12	.....9.80
Crawfordsville,Ind. M8	..9.90
Donora,Pa. A7	.....9.80
Duluth,Minn. A7	.....9.80
Jacksonville,Fla. M8	..10.36
Johnstown,Pa. B2	....9.80
Joliet,Ill. A7	.....9.80
Kokomo,Ind. C16	.....9.90
LosAngeles B3	.....10.60
Minnequa,Colo. C10	...9.95
Pittsburg,Calif. C11	...10.60
S.Chicago,Ill. R2	.....9.80
SparrowsPt.,Md. B2	....9.90
Sterling,Ill. N15	.....9.70

WIRE, Barbed	**Col.**
AlabamaCity,Ala. R2	..175**
Aliquippa,Pa. J5	.....172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	..181
Donora,Pa. A7	.....175†
Duluth,Minn. A7	.....175†
Fairfield,Ala. T2	.....175†
Houston,Tex. S5	.....180**
Jacksonville,Fla. M8	..186
Johnstown,Pa. B2	....179*
Joliet,Ill. A7	.....175†
KansasCity,Mo. S5	..180**
Kokomo,Ind. C16	*193†*
Minnequa,Colo. C10	..180**
Monessen,Pa. P7	....178††
Pittsburg,Calif. C11	...196†
Rankin,Pa. A7	.....175†
S.Chicago,Ill. R2	.....175**
S.SanFrancisco C10	...195**
SparrowsPoint,Md. B2	..181*
Sterling,Ill.(1) N15	...179††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	....162**
Aliq'ppa,Pa.9-14½ga.J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	..165
Donora,Pa. A7	.....162†
Duluth,Minn. A7	.....162†
Fairfield,Ala. T2	.....162†
Houston,Tex. S5	.....167**
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	..166
Joliet,Ill. A7	.....162†
KansasCity,Mo. S5	....167**
Kokomo,Ind. C16	*180†*
Minnequa,Colo. C10	...167**
Monessen,Pa. 9 ga. P7	.166††
Pittsburg,Calif. C11	...185†
Rankin,Pa. A7	.....162†
S.Chicago,Ill. R2	....162**
Sterling,Ill.(1) N15	...166††

WIRE (16 Gage)	**An'ld Galv.**	**Stone**
Ala.City R2	...14.50	16.05**
Bartonville K4	..14.50	16.55
Buffalo W12	....14.50	....
Cleveland A7	....14.50	....
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	..14.60	16.15†
Jacksonville M8	..14.85	16.80
Johnstown B2	..14.50	16.40*
Kokomo C16	*15.10*	*16.65†*
Minnequa C10	..14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	..14.50	16.05**
SparrowsPt. B2	..14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	..14.50	16.05
Worcester A7	...14.80	....

WIRE, Merchant Quality (6 to 8 gage)	**An'ld Galv.**
Ala.City,Ala. R2	..7.50	7.90**
Aliquippa J5	....7.40	7.925§
Atlanta A11	.....7.60	8.20
Bartonville(48) K4	7.60	8.20
Buffalo W12	.....7.50	7.90†
Cleveland A7	.....7.50	....
Crawfordsville M8	7.60	8.20
Donora,Pa. A7	...7.50	7.90†
Duluth,Minn. A7	..7.50	7.90†
Fairfield T2	....7.50	7.90†
Houston(48) S5	..7.65	8.05**
Jacks'ville,Fla. M8	7.85	8.45
Johnstown B2(48)	7.50	8.10*
Joliet,Ill. A7	....7.50	7.90†
Kans.City(48) S5	7.65	8.05**
Kokomo C16	*8.10*	*8.50*
LosAngeles B3	...8.45	9.05*
Minnequa C10	....7.65	8.05**
Monessen P7(48)	7.40	8.00††
Palmer,Mass. W12	7.50	8.20†
Pitts.,Calif. C11	..8.45	8.85†
Portsmouth,O. P12	*8.80*	....
Rankin,Pa. A7	...7.50	7.90†
S.Chicago R2	....7.50	7.90**
S.SanFran. C10	..8.35	8.75**
Spar'waPt. B2(48)	7.60	8.20*
Stir'ling(1)(48)	N15 7.40	8.00††
Struth'rs,O(48)	Y1 7.50	8.00§
Worcester,Mass. A7	7.80	8.20†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop	**Col.**
AlabamaCity,Ala. R2	...175
Atlanta A11	175
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	175
Duluth,Minn. A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla. M8	182
Joliet,Ill. A7	175
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	*179*
Minnequa,Colo. C10	178
Pitts.,Calif. C11	199
S.Chicago R2	175
S.SanFran.,Calif. C10	..197
SparrowsPoint,Md. B2	...177
Sterling,Ill.(1) N15	173

FENCE POSTS

	Col.
Chicagoflts.,Ill. C2, I-2	..157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	...157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

1½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55

Under-Size Body (rolled thread; not nutted):

⅜" x 6" and smaller	61

†1½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

Lag Bolts

All diams. & 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED

(Nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
5/16" to ½" diam., incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:	
25,000 to 199,999 pieces	39
200,000 or more pieces	27
5/16" to ½" diam. incl.:	
15,000 to 99,999 pieces	39
100,000 or more	27

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:

6" and shorter:	
¼" through ½" diam.	34
⅝" & ¾" diam.	31
⅞", 1"	8
Longer than 6":	
¼" through ⅝" diam.	3
¾" through 1" diam.	+13

High Carbon, Heat-treated:

6" and shorter:	
¼" through ½" diam.	20
⅝" & ¾" diam.	16
⅞", 1"	+11
Longer than 6":	
¼" through ⅝" diam.	+23
¾" through 1" diam.	+61

(New Std. Hexagon head, upset, bulk)

Bright:

½" x 6" & smaller & shorter	49
⅝", ¾", ⅞" diam. x 6" & shorter	48
⅝", ¾", 1" x 6" & shorter	31

High Carbon, Heat-treated:

½" x 6" & smaller & shorter	41
⅝" x ⅞" diam. & 6" & shorter	39
⅝", ¾", 1" x 6" & shorter	20

NUTS

Reg. & Heavy Square Nuts:

All sizes	61

H.P. Reg. & Heavy Hex Nuts:

⅜" & smaller	64
⅞" to 1½" incl.	63
1⅝" to 1½" incl.	65
1⅝" & larger	61

C.P. Reg. & Heavy Hex Nuts

⅜" & smaller	64
⅞" & larger	61

Semifinished & Finished Nuts

⅜" & smaller	66
⅞" & larger	63

Semifinished Slotted Reg. & Heavy Hex Nuts

⅜" & smaller	66
⅞" & larger	63

Hot Galvanized Nuts, all types

1½" & smaller	44

(On above items, add 25% for less than case quantities)

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅜" incl., Square:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
No. 2 to ⅜" incl., Hex.:	
25,000 to 199,999 pieces	18
200,000 or more pieces	25

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95

$\frac{7}{8}$-in. under..List less 32½

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless N.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.55	20.90
1¼	13	....	26.53	21.25
1½	13	24.24	24.22	23.50
1⅝	13	28.63	33.34	27.76
2	13	32.09	37.37	31.13
2⅛	13	34.14	42.09	35.00
2¼	13	39.23	45.67	38.00
2½	12	43.23	50.31	41.91
2⅝	12	46.79	54.48	45.38
3	12	49.90	58.10	48.38

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb No. 2
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	*6.15*
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B3	....	....	...(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	...(16)	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S10	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	....5.625
Gary,Ind. U5	.....5.625
Ind.Harbor,Ind. I-2	...5.625
Lackawanna,N.Y. B2	..5.625
Minnequa,Colo. C10	...5.625
Seattle B3	.....5.775
Steelton,Pa. B2	.....5.625
Torrance,Calif. C11	...5.775

TRACK BOLTS, Untreated

Cleveland R2	.....12.15
KansasCity,Mo S5	...12.90*
Lebanon,Pa. B2	.....12.15
Minnequa,Colo. C10	...12.15
Pittsburgh O3, P14	...12.15
Seattle B3	.....12.65

*Treated

AXLES

Ind.Harbor,Ind. S13	....7.50
Johnstown,Pa. B2	.....7.50

JOINT BARS

Bessemer,Pa. U5	....5.825
Fairfield,Ala. T2	....5.825
Ind.Harbor,Ind. I-2	...5.825
Joliet,Ill. U5	.....5.825
Lackawanna,N.Y. B2	..5.825
Minnequa,Colo. C10	...5.825
Steelton,Pa. B2	.....5.825

SCREW SPIKES

Cleveland R2	.....11.90
Pittsburgh O3	.....11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	....8.05
Ind.Harbor,Ind. I-2, Y1	..8.05
KansasCity,Mo. S5	....7.90
Lebanon,Pa. B2	.....8.05
Minnequa,Colo. C10	....7.90
Pittsburgh J5	.....8.05
Seattle B3	.....8.55
S.Chicago,Ill. R2	.....8.05
Struthers,O. Y1	.....8.05
Youngstown R2	.....8.05

Footnotes

(1) Chicago base.
(3) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.242 in.; for gage 0.142 and lighter, 0.30c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(24) Deduct 0.10c, finer than 15 Ga.
(26) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Sanderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 6.95c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.20c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 2½ in. and smaller rounds; 7.95c over 2½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	4	....	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+28	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Billets Forging	Billets Seamless Tube	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	40.25	....	43.75	45.25	47.25	50.00	54.25	54.25
305	23.25	30.50	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	25.00	32.00	40.00	....	42.75	45.25	47.50	51.75	54.00	54.00
309	32.50	41.25	48.25	....	55.00	54.00	56.75	60.25	69.00	69.00
310	39.75	50.50	64.75	....	71.00	72.25	76.50	78.25	81.75	81.75
314	....	....	....	....	....	72.75	....	78.25	....	....
316	33.00	41.75	52.75	....	59.75	58.75	62.75	66.00	70.25	70.25
316L	....	....	58.75	....	65.75	64.75	69.75	73.00	77.25	77.25
317	40.25	51.25	65.75	....	76.50	74.75	78.50	81.00	87.75	87.75
321	26.50	33.50	39.75	....	45.75	45.00	47.25	51.25	56.25	56.25
18-8CbTa	30.75	39.50	47.25	....	54.75	52.75	55.50	60.00	68.50	68.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates Carbon Base 10%	Plates Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	30.50
304	31.55	37.95	32.50
304-L	34.10	40.90	....
316	36.50	42.75	47.00
316-L	42.30	50.10	....
316-CB	42.50	50.50	....
321	33.25	39.65	37.25
347	36.20	44.35	45.25
405	26.35	33.85	....
410	28.85	33.35	....
430	28.85	33.35	....
Inconel	59.00	65.95	....
Nickel	41.60	56.15	....
Nickel, Low Carbon	43.80	60.55	....
Monel	44.50	60.50	....
Copper*	....	....	46.00

	Strip, Carbon Base Cold Rolled 10%	Strip, Carbon Base Cold Rolled Both Sides
Copper*	33.40	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...	.....	4.090
18.25	4.25	1	4.75	...	.....	2.305-2.475
18	4	2	9	...	.....	2.675-2.775
18	4	2	....	...	.....	1.765
18	4	1	....	...	.....	1.600
13.75	3.75	2	5	...	.....	2.245
13.5	4	3	....	...	.....	1.865
9	3.5	..	....	...	.....	1.180
6	4	2	....	5	.....	1.105
6	4	3	....	6	.....	1.350
1.5	4	1	....	8.5	.....	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	59.00†	63.00	....
Woodward,Ala. W15	*58.50*	*59.00‡*	*63.00*	....
Cincinnati, deld.	....	*66.70*	....	....
Buffalo District				
Buffalo H1, R2	60.00	60.50	61.00	61.50
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	70.65	71.15	71.65	....
Rochester,N.Y., deld.	63.02	63.52	64.02	....
Syracuse,N.Y., deld.	64.12	64.62	65.13	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	60.00	....	60.50	....
S.Chicago,Ill. R2	60.00	....	60.50	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	62.30
Muskegon,Mich., Deld.	....	67.18	67.18	....
Cleveland District				
Cleveland R2, A7	60.00	60.50	60.50	61.00
Akron,O., deld.	62.75	63.25	63.25	63.75
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
New York, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.76	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland, Pa. A3	62.00	62.50	63.00	63.50
Philadelphia, deld.	63.76	64.26	64.76	65.26
Troy,N.Y. R2	62.00	62.50	63.00	63.50
Pittsburgh District				
Neville Island,Pa. P6	*62.50*	*63.00*	*63.00*	*63.50*
Pittsburgh (N&S sides), Aliquippa, deld.	....	*64.45*	*64.45*	*64.98*
McKeesRocks, deld.	....	*64.10*	*64.10*	*64.63*
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	*64.76*	*64.76*	*65.29*
Verona,Trafford, deld.	*64.79*	*65.32*	*65.32*	*65.85*
Brackenridge, deld.	*65.10*	*65.60*	*65.60*	*66.11*
Bessemer,Pa. U5	60.00	....	60.50	61.00
Clairton,Rankin,S.Duquesne,Pa. U5	60.00	....	....	....
Midland,Pa. C18	60.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	60.50	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	60.50	61.00
Mansfield,O., deld.	64.90	....	65.40	65.90
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	*63.25*	*63.75*	*64.25*	....
Fontana,Calif. K1	67.50	68.00	....	....
Geneva,Utah C11	60.00	60.50	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	60.00	60.50	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	65.76	66.26	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
†Phos. 0.70-0.90; intermediate (Phos. 0.31-0.70%), $60
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.69%), $56

PIG IRON DIFFRENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	69.00
Buffalo H1	70.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 19%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T5 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	71.55
Troy,N.Y. R2 (Phos. 0.035% max)	68.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Neville Island,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	*67.50*

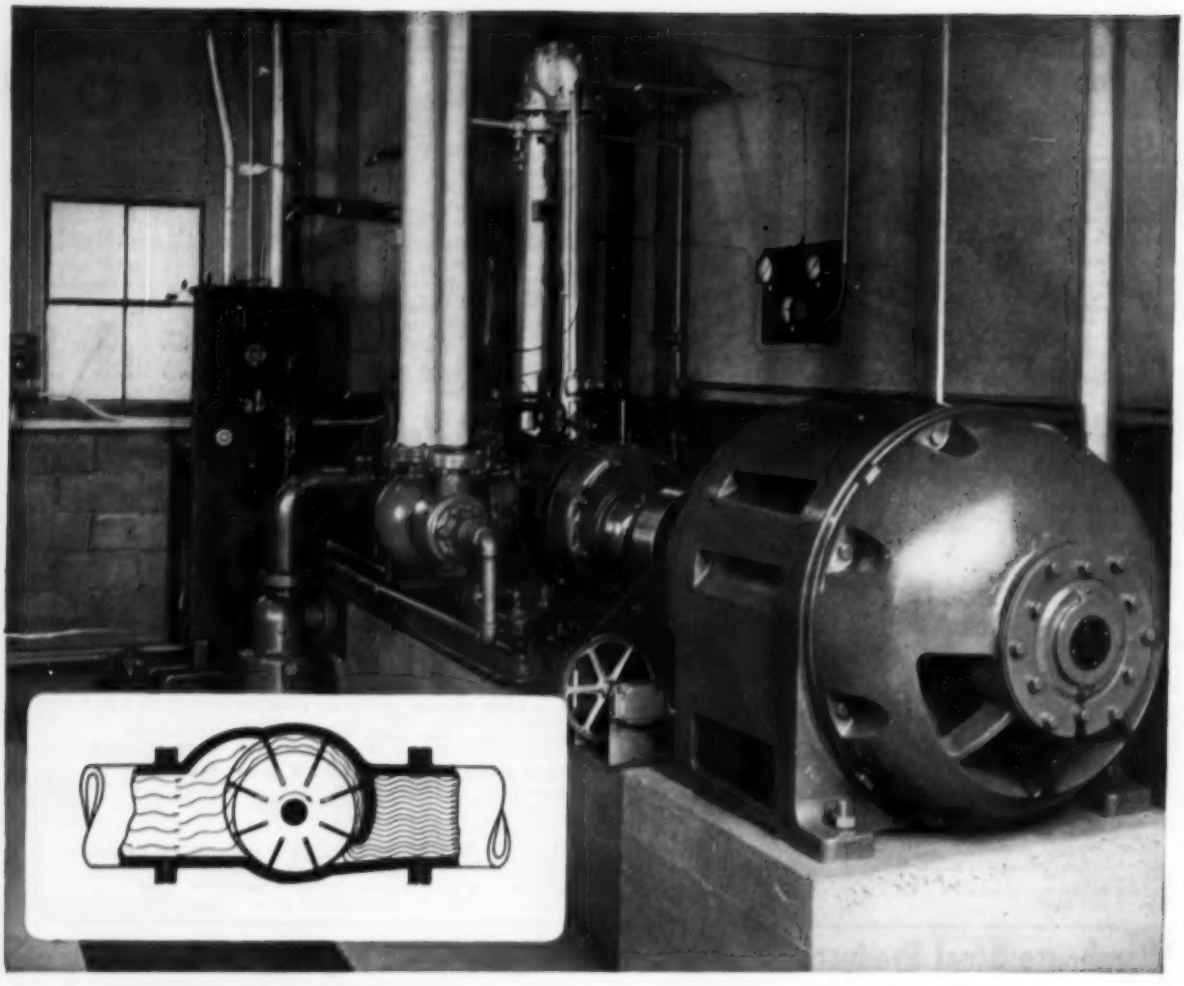
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	...	8.49‡	14.39	7.94	7.56	9.02
Birmingham	7.63‖	8.50‖	8.85‖	....	7.71	7.77	8.95	...	....	7.93	7.95	10.00
Boston	8.12	9.07	10.32	53.32	8.21	8.21	8.76	9.73	13.66	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.50	7.60	7.65	9.00
Chattanooga	7.78‖	8.69‖	8.60‖	....	7.86	7.92	8.45	...	....	8.13	8.10	9.82
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.15	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.40	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.21	7.76	7.62	8.89
Denver	8.95	10.31	11.73	....	9.10	9.10	...	9.82	17.87	8.95	9.10	10.50
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.39	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95††	....	7.31	7.35	...	8.10††	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	....	9.95	14.00	8.20	8.00	9.20
Jackson, Miss.	7.96‖	8.77‖	9.22‖	....	7.94	8.09	8.62	...	....	8.25	8.27	9.94
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.40	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.24	7.60	7.54	8.81
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	7.78	8.88	9.63	53.13	8.23	8.16	8.71	9.77	13.57	8.11	8.21	9.50
Norfolk, Va.	7.35	....	....	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	....	7.99	7.73	8.26	8.52	13.35	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.31	7.27	7.80	9.00	13.15	7.43	7.45	8.72
Portland, Oreg.	8.30	8.80	10.80	....	8.55	8.25	...	12.55	15.30	8.20	8.20	10.10
Richmond, Va.	7.25	....	9.49	....	7.85	7.85	....	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.39	43.89	7.50	7.56	8.09	8.29	13.44	7.83	7.74	9.01
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.20	9.65	9.95	51.65	8.35	8.15	8.70	11.45	14.40‡	8.25	8.30	10.50
Seattle	8.75	10.50	10.90	49.60	8.90	8.60	9.15	12.25	14.75	8.50	8.50	10.70
Spokane, Wash.	8.75	11.10	10.90	....	8.90	8.60	9.15	12.25	15.40	8.50	8.50	11.20
Washington	7.78	9.30	8.60	....	8.49	8.24	...	9.49	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‖includes 25-cent bar quality extras; **⅜-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 6000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ‡—400 to 999 lb; §—2000 to 2999 lb; ††—2000 lb and over.



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T-1 Gains New Markets

U. S. Steel to quadruple capacity for new high yield-strength, alloy steel. Biggest applications are in earthmoving machinery and mining, but new uses are developing

U. S. STEEL CORP. will quadruple its capacity for producing T-1, high yield-strength, alloy steel, by year end. That's good news for a rapidly-growing list of customers who are clamoring for more.

The corporation is installing a multimillion-dollar heat treating line for increased production of T-1 plate at its Homestead Works, Munhall, Pa. Facilities will be in operation late in the fourth quarter.

Demand for this low carbon, quenched and tempered construction steel has exceeded supply since its applications began to mount after the Korean War. U. S. Steel patented the product in February, 1952. Partially to broaden supply, the corporation licensed Lukens Steel Co., Coatesville, Pa., in November, 1954, to make T-1. Lukens produces the alloy in plate and fabricated form. It is also studying production of T-1 clad with stainless steel.

More Production—Corporation sales officials report the new Homestead line will assist them to meet growing requirements for steel with high yield strength (90,000 psi or more) and excellent weldability, yet tough enough to withstand extreme stresses, pressures and temperatures.

U. S. Steel sales people anticipated a potential need for high yield-strength construction steel before World War II. After several years of technical development, the corporation patented it and sold it in limited quantities, mainly for earthmoving equipment and mining applications.

Comes of Age—T-1 has now left its infancy. Tests have proven its value in pressure vessel construction, U. S. Steel officials report. The corporation claims: "T-1 steel is vastly more versatile and more capable in this application than any other material regardless of strength level."

Sales officials point out that fabricators can use T-1 to advantage in many applications where improved performance is required. The steel has three times the yield strength of standard carbon steel, toughness at subzero temperatures and weldability without preheating or stress relieving.

Research in Shapes—U. S. Steel produces T-1 primarily in plate, with smaller amounts of bars, sheet and forgings. The corporation's researchers are studying possible production of T-1 structural shapes.

Bulk of applications now is in the first industries to use it—earthmoving and mining equipment. Best potential uses may be in pressure vessels and bridge construction. There the steel is used in parts such as tension members, subject to high stresses. The Carquinez Straits bridge, being fabricated for erection near San Francisco, contains 3600 tons of T-1. Other promising new uses are in the electrical power generating and shipbuilding industries.

Earthmoving—An operator of power shovels in Minnesota lost much of his equipment investment prior to 1954, due to the dipper sticks cracking from shock loading in extreme cold. The firm specified T-1 steel for dipper sticks and has had no failures in two winters.

When Marion Power Shovel Co., Marion, O., built a 5.5 million lb electric shovel for Hanna Coal Co., division of Pittsburgh Consolidation Coal Co., Pittsburgh, it used T-1 steel for the bucket. Marion also used the new alloy steel in its dipper stick and in other moving parts which had to withstand unusually rugged service.

Big Handful—Marion's dipper can lift 60 cubic yards of overburden. U. S. Steel researchers estimate that maximum capacity of the bucket if made in the conventional way would be about 45 cubic yards.

The industrial equipment field uses T-1 steel in heavy-duty applications. One large steelmaker employs T-1 in chutes handling coke, coal, sinter and limestone. Initially higher cost is outweighed by longer service. One steel plate chute handled 600-degree sinter for ten months before replacement. That's three times the life of any other steel employed in that application. In other steel plants longer service in similar impact and abrasive resistance applications is winning new friends for T-1 among many equipment producers and users.

Steel Bars . . .

Bar Prices, Page 186

Most bar buyers appear to have fairly comfortable inventories. Most users of hot-rolled, including cold-finishers, feel they should be able to weather the steel strike without too much difficulty, especially should the walkout prove to be of only moderate duration. Exceptions are consumers of large rounds, supplies of which were short before the walkout.

Machine tool builders have 60 to 90 days' steel inventories. In New England, the average consumer is said to be holding close to 60 days' supply. Cold-finished bar mills still operating can meet any emergency demand over the next few weeks. They are fairly well stocked at most points with hot-rolled material.

One potential problem of New England forge shops and other bar users supplying the automotive industry involves tonnage for the 1957 model cars.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 187 & 188

Most consumers of hot and cold-rolled sheets have sufficient tonnage to support manufacturing operations pretty well into August. This is particularly true in the case of cold-rolled.

Galvanized sheet stocks also are adequate. Fabricators using low silicon sheets and enameling stock are reasonably well supplied with these grades considering the substantial inventories of household durables at the retail level.

Sheet buyers in the Pittsburgh area are not seriously affected by the steel strike yet. Loosening of the market in second quarter permitted them to build up their inventories. In addition, two area producers are continuing to operate, Armco Steel Corp. at Butler, Pa., and Weirton Steel Co. at Weirton, W. Va.

New England consumers report their cold-rolled strip inventories are substantial.

Because of their heavy inventories, cold-strip users are not pressing for tonnage from mills in position to accept orders.

Those sheet and stripmakers still operating are seeking to protect themselves against retroactive wage increases by raising their prices, their new quotations reflecting their best guesses as to what the wage settlement will cost.

Newport Steel Corp., Newport, Ky., division of Merritt-Chapman & Scott Corp., New York, increased prices effective July 6. The advances range from $8 a ton on hot-rolled sheets to $14 on alloy sheets and plates.

Effective on shipments July 5, Detroit Steel Corp., raised prices on its major products $7 to $16 a ton. The company's labor agreements do not expire until July 30.

Granite City Steel Co., Granite City, Ill., boosted its prices $8.50 to

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Such an amount can disappear in a hurry. A gear is a very critical part in a product; it has a lot to do with the efficiency of the product and the ultimate satisfaction the product gives your customer . . . an importance far beyond its relative size *or price*. That's why we say the *right* gear is more important than the *cheapest* gear.

Certainly, in competitive times such as these, it is necessary for any manufacturer to reduce costs wherever possible. But when cost-cutting affects product quality or efficiency, watch out. The saving in dollars and cents on a "cut-price" gear is usually pretty small, if there is a saving at all, over buying the gear that is assuredly "right" for the job. And if your specifications indicate possible use of a custom gear, talk to someone from Cincinnati Gear first and let him point out the advantages of custom gearing, and how good gears can be an economy in the long run. You'll find that putting the major emphasis on getting the *right* gear for the job will pay off handsomely.

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$12 a ton, effective July 10. Hot-rolled carbon steel sheets went up $8.50 a ton, cold-rolled sheets $10, and galvanized sheets $12.

Continental Steel Corp., Kokomo, Ind., also increased prices on all its products, effective July 5. The increases, averaging about 7 per cent, are identical with those made a year ago after the steel wage settlement.

Wisconsin Steel Division, International Harvester Co., Chicago, is another producer which has raised prices. It announced a rise of 25 cents per 100 pounds in the base prices of all hot-rolled and cold-finished carbon and alloy steel products, effective July 3.

Stainless Steel . . .

Stainless Steel Prices, Page 190

Washington Steel Corp., Washington, Pa., producer of stainless steel sheet and strip, increased its net prices 8 per cent, effective July 9.

Another producer of stainless products, Joslyn Mfg. & Supply Co., Chicago, raised stainless prices 8 per cent, including both base prices and extras. The increase, effective July 9, is an interim action until the steel strike is settled and products can be repriced on the basis of the wage settlement.

Tubular Goods . . .

Tubular Goods Prices, Page 190

Recent authorizations of the Federal Power Commission include one to the El Paso Natural Gas Co., El Paso, Tex., for construction and operation of natural gas facilities in Andrews and Ector counties, Texas. Proposed construction consists of approximately 65 miles of various diameter gathering lines, plus field compression in the approximate amount of 440-hp; a 2640-hp compressor station; and metering and communications facilities; also approximately 16 miles of 20-in. line; 16 miles of 4.5-in. liquid products pipeline; 11 miles of 4.5-in. fuel line; and a gasoline plant with capacity of 20 million cu. ft. daily.

The first users of tubular goods to be affected by the steel strike are the gas and oil industries. Other consuming lines hold substantial inventories accumulated prior to the work stoppage. They are in position to continue to operate at a satisfactory rate the rest of this month.

All major suppliers of oil country tubing are closed by the strike. This includes National Tube Division, U. S. Steel Corp., National Supply Co., Jones & Laughlin Steel Corp. and Pittsburgh Steel Co.

One Philadelphia area merchant pipe distributor advanced prices 10

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per cent, advising customers that if such an increase is not made at the mill level following the steel strike, proper adjustments will be made on purchases at the new schedule. If the mill increase is more than 10 per cent, the distributor will absorb the loss.

Cast iron pipe sales agencies in the Pacific Northwest report that a record volume of sales was made in June, buying being stimulated by an $8 per ton increase in prices which became effective July 1. As a result, little new business has developed so far in July.

U. S. Pipe & Foundry Co., Birmingham, increased the price of cast pipe $6 a ton and fittings $10 a ton.

The A. M. Byers Co., Pittsburgh, increased prices of all its wrought iron products 7 per cent. The increases were made effective July 2.

Plates . . .

Plate Prices, Page 186

Despite the steel strike, supplies of plates haven't dried up completely, but the situation is becoming increasingly critical as time passes.

Two plate mills are operating in the East. One is Alan Wood Steel Co. at Conshohocken, Pa., and the other is Barium Steel Corp.'s subsidiary, Phoenix Iron & Steel Co., at Harrisburg, Pa. This accounts for the fact fabricators in the area are still able to get some tonnage. The Conshohocken producer's labor contract expires at the end of July; the Harrisburg mill's at the end of August.

A wide range of consumers, including tankmakers, line pipe fabricators, heavy equipment builders, freight car builders and structural fabricators, are feeling supply pinch with increasing severity. Most eastern shipyards are in fair shape with respect to steel supply at the moment.

Heavy plate shops will have to curtail operations next month unless additional tonnage is forthcoming in New England. Prospects of getting steel from the warehouses are slim since they do not have enough plates on hand to keep their own plate shops operating fully. Layoffs at New England railroad car repair shops are due to retrenchment, not the plate shortage, however.

In estimating new work, fabricators are up in the air not only as to steel supply, but also as to steel prices. New tonnage coming from the plate mills still operating is either premium-priced or on a higher base than formerly.

The strike has ended hopes that the continuous sheet mills would be able to turn out more light plates and thus ease the supply shortage.

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ship ever built on the Gulf Coast was laid July 6 at the Pascagoula, Miss., shipyard of Ingalls Shipbuilding Corp., Birmingham.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 186

At the pre-strike rate of demand, some reinforcing bar contractors say they have about three to four weeks' supplies on hand. Since business has slowed down to some extent, this should mean they will be able to care for most demands a little longer.

Largest recent buying in the East involves 2300 tons of bars for Gimbel's branch store in Philadelphia.

Expectations are prices will go up generally upon settlement of the steel strike. Meanwhile, those reinforcing bar producers which are not closed down by the strike are thought likely to raise their prices for the interim similar to the action of the Milton Steel Division, Milton, Pa., Merritt-Chapman & Scott Corp.

This latter company raised prices on reinforcing steel $9 a ton, effective midnight July 5.

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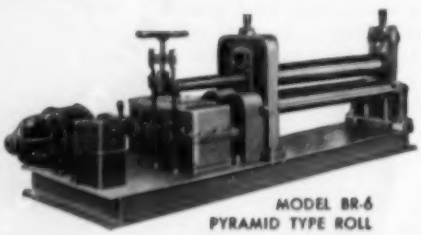
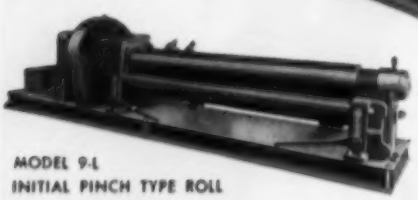
PLATE BENDING ROLLS

The Webb Corporation offers a complete line of Plate Bending Rolls for the rolling of the thinnest plate up to plate 2½" thick. Offered in a variety of lengths and thicknesses. Constructed for the modern fabricating shop.



MODEL BR-6
PYRAMID TYPE ROLL

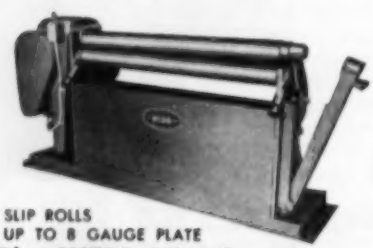


MODEL 9-L
INITIAL PINCH TYPE ROLL

Two types available: the Initial Pinch Type and Pyramid Type machines. All latest advantages of today's modern machine tools are incorporated, utilizing anti-friction bearings, totally enclosed gear drives. Special forming rolls for culvert pipe, stock tanks and other special shapes available.

SLIP ROLLS

A complete line of small Sheet Metal Forming Rolls are also available. All power-driven with shaft sizes 3" to 5" for the handling of the thinnest gauge material, up to 8 gauge material. Special rolls for the forming of polished sheets, aluminum and stainless steels can be furnished. Complete catalogues on any size machine furnished upon request; write Dept. D.



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PYRAMID TYPE ROLL

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STEELWORKERS

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Since 1881 THE WEBB CORP.
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Tool Steel . . .

Tool Steel Prices, Page 190

Shipments of high speed and tool steel (exclusive of hollow drill steel) totaled 12,730 net tons in May, reports the American Iron & Steel Institute. This was substantially up from the 11,720 tons shipped in April and the 10,067 tons moved in May, 1955.

Cumulative shipments through May this year amounted to 57,546 net tons. This compares with 45,287 tons in the like period of last year.

Allegheny Ludlum Steel Corp., Pittsburgh, now is making available to the metalworking industry hot extruded tool and high speed steel shapes. This is the first time extruded shapes in those materials have been offered the trade.

Wire . . .

Wire Prices, Pages 188 & 189

Effective with shipments July 5, Detroit Steel Corp. advanced prices on its major products $7 to $16 a ton. Labor contracts at the corporation's Portsmouth, O., Detroit and eastern mills do not expire until July 30.

Rod and wire products were increased from $7 to $16 a ton. These raises are indentical with those made a year ago.

Merchant wire product inventories are not as heavy, relatively, as are wire stocks required for industrial goods, heading, spring, manufacturers and the higher carbon grades.

Warehouse . . .

Warehouse Prices, Page 191

Distributors of oil country goods, plates and structural shapes report heavy demand for their products, resulting from the shutoff of mill deliveries. Many large buyers who ordinarily place orders with mills had been purchasing from warehouses prior to the strike, as these products have been in short supply most of this year.

In other products, such as bars and sheets, distributors have not experienced a heavy influx of new orders as a direct result of the strike. Most users have inventories of more than 30 days' needs.

Fabricators experienced a dull first-half of July, due mainly to vacations. They are not expected to be hurt by a pinch in sheet supply until the middle of August.

On the West Coast, the strike finds the warehouse industry in poor position on plates and some structurals.

Structural Shapes . . .

Structural Shape Prices, Page 186

Most structural fabricating shops associated with primary steelmakers are closed by the strike, and independent fabricators are beginning to curtail operations with the chances good some will be forced to close shortly because they lack rounded structural steel inventories.

Various field operations are being halted. New contracts have slowed down considerably. Some major projects are being held up pending a review of steel delivery prospects and costs. There is a disposition to await new steel prices and the influence of these on other products; also, eventual increase in steel labor costs and its effect on labor costs in the building trades.

On the other hand, some work is going ahead and certain projects placed prior to the strike are only now being announced as awarded.

Philadelphia area fabricators are particularly hard hit by the strike because most leading shops either are affiliated with the steel companies and are strikebound, or they lack adequate inventories. A number of the latter will resume operations after mass vacations the first two weeks of July, but their prospects for continuing active for any length of time are remote.

This situation, combined with the unsettled price outlook, has brought structural awards in the area to a low ebb.

Buffalo area fabricators also are severely affected by the shortage of structurals.

New England shops are losing ground on delivery schedules. Bridges, notably plate girder work, extended into the second half, 1957, are slowing down or are at a standstill at numerous plants. Some shops are starting new jobs with miscellaneous steel on hand, but the suspension of plain material shipments is affecting most individual in-plant contracts, it is reported.

Estimating of new structural inquiry is off in New England, but bridge and power plant volume continues active. Bridge contractors are closing promptly on steel after getting awards. Included are 27 bridges for the Connecticut turnpike involving 5500 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13,085 tons, superstructure, state bridge near the Hudson between Albany and Rensselaer, Co., New York.

950 tons, junior-senior high school, New Or- N. Y., to Harris Structural Steel Co., New York.

2519 tons, state thruway, contract 327-01, Norwich and Lisbon, Conn., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

2500 tons, eight grade separation structures, Connecticut turnpike, project 327-01, Norwich-Lisbon, to American Bridge Division, U. S. Steel Corp., Pittsburgh; M. A. Gammino Construction Co., Providence, R. I., and Brunalli Construction Co., Southington, Conn., joint general contractors.

1200 tons, power transmission towers, to Bethlehem Pacific Coast Steel Corp., Seattle, by Bonneville Power Administration, Portland, Oreg.

1025 tons, state bridge work, Onandago county, New York, through Harrison & Burrows, general contractor, to Harris Structural Steel leans, to Orleans Material & Equipment Co., New Orleans; J. A. Jones Construction Co., Shreveport, La., general contractor.

470 tons, plant, Waynesboro, Va., to Belmont Iron Works, Eddystone, Pa.

410 tons, Washington distributing house, Western Electric Co., Arlington, Va., to Southern Iron Works Inc.

330 tons, bridges, flood reconstruction, Ansonia, Conn., through Mariani Construction Co., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

280 tons, state turnpike, contract 328-01, Ledyard, Griswold and Plainfield, Conn., through M. A. Gammino & Brunalli Construction Co., joint contractors, to Bethlehem Steel Co., Bethlehem, Pa.

230 tons, bridge, Putnam county, New York, through Brunalli Construction Co., general contractor, to McDermott Steel Specialties Inc.

285 tons, Du Pont sales, service and laboratory building, Wilmington, Del., to Belmont Iron Works, Eddystone, Pa.

(*Please turn to page* 200)

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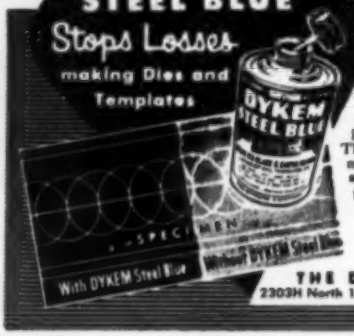

Popular package is 8-oz can fitted with Bakelite cap holding soft-hair brush for applying right at bench, metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief prevents metal glare. Increases efficiency and accuracy

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D, $1.80 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 5% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $260 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 2.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 5% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 2000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 2000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 2000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 2000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.5c. Packed, pallets 7.5c; bags 8.20c; 2000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ⅛ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Bigle, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.84 in all sizes except powdered which is $1.66; Washington, Pa., furnace, $1.54.

Technical Molybdic-Oxide: Per lb contained Mo. f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth and Washington, Pa.

(Concluded from page 197)

170 tons, Hyatt office building, Staten Island, New York, to Eggers & Higgins, architect, to unnamed fabricator.

135 tons, industrial park addition, Hooksett, N. H., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

150 tons, Merrow road bridge, Coventry, Conn., through Charter Oak Construction Co., to McDermott Steel Specialties Inc.

STRUCTURAL STEEL PENDING

2085 tons, 10 grade separation structures, one railroad and one stream crossing, Connecticut turnpike project 328-01, Ledyard-Griswold-Plainfield; M. A. Gammino Construction Co., Providence, R. I., and Brunalli Construction Co., Southington, Conn., joint general contractors.

1278 tons, plant building No. 140, Du Pont interests, Antioch, Calif.; bids asked.

1200 tons, Morrison street bridge west approaches, Portland, Oreg.; Donald M. Drake Co., Portland, low at $1,178,360.

970 tons, seven grade separation structures, Connecticut turnpike project 330-01, Plainfield-Killingly; Brunalli Construction Co., Southington, Conn., and M. A. Gammino Construction Co., Providence, R. I., joint general contractors; also 795 tons, reinforcing bars.

487 tons, state bridge, route 37, section 16, Ocean county, N. J., bids July 24; also 158 tons of reinforcing steel.

250 tons, also reinforcing and 3600 feet of piling, Washington state truss bridge, Whatcom county; C. B. Croy, Bellingham, Wash., awarded at $147,205.

270 tons, single span welded composite bridge, Pomeraug river, Southbury, Conn.; also steel piling, and 45 tons of reinforcing bars.

215 tons, stringer bridge, St. James avenue, Springfield, Mass.; Berke-Moore Co. Inc., Boston, low on general contract.

175 tons, two-span continuous welded girder bridge, Wilbur Cross parkway, Ashford-Union, Conn.

150 tons, reconstruction of Columbia road bridge, Boston; bids in to the Metropolitan District Commission.

125 tons, state highway bridge, Shepaug river, Washington, Conn.; also 85 tons, steel piles, and 85 tons, reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2300 tons, Gimbel's Department Store, 60th and Market streets, Philadelphia, 1600 tons going to Bethlehem Steel Co., Bethlehem, Pa., and 350 tons, each, to the Concrete Steel Co. and the American Steel Engineering Co., Philadelphia.

1200 tons, 17-story office building and parking garage, Graver Improvement Co., New Orleans, to Laclede Steel Co., St. Louis, and Orleans Material & Equipment Co., New Orleans, through R. P. Farnsworth & Co., New Orleans. (Noted July 9 but suppliers unnamed.)

1150 tons, 14 bridges and box culvert, Connecticut turnpike project 326-01, Montville-Norwich, to Milton Steel Division, Merritt-Chapman & Scott Corp., Milton, Pa., through parent company, general contractor.

425 tons, junior-senior high school, New Orleans, to Truscon Steel Division, Republic Steel Corp., New Orleans; J. A. Jones Construction Co, Shreveport La., general contractor.

250 tons, dormitory, Villanova University, Villanova, Pa., to the Concrete Steel Co., Philadelphia.

150 tons, naval installation, Whidbey Island, Wash., to Soule Steel Co., Seattle; James I. Barnes Construction Co., Seattle, general contractor.

125 tons, telephone exchange, Yakima, Wash., to Soule Steel Co., Seattle.

120 tons, Lombard substation, Philadelphia Electric Co., Philadelphia, to American Steel Engineering Co., Philadelphia.

REINFORCING BARS PENDING

160 tons, Washington state overcrossing, Thurston county; bids to Olympia, Wash., postponed to July 16.

158 tons, state bridge work, route 37, section 16, Ocean county, N. J., bids July 24; also 487 tons of structural steel.

PLATES . . .

PLATES PENDING

1200 tons, four fuel storage tanks, Ft. Richardson, Alaska; general award to Patti-MacDonald Co., St. Louis.

PIPE . . .

CAST IRON PIPE PLACED

112 tons, system expansion, McMinnville, Oreg., to U. S. Pipe & Foundry Co., Seattle.

STEEL PIPE PLACED

200 tons, 30-in., Esso Standard Oil Co., Everett, Mass., to unnamed fabricator.

RAILS, CARS . . .

RAILROAD CARS PLACED

Union Pacific, 35 mail storage cars and 15 baggage cars, to ACF Industries Inc., New York.

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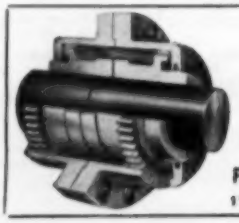
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Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.30; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa. $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Philadelphia, Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis $259.45; Bridgeburg, Pa. $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	13.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	23.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$33.00-35.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.30-$1.35 nom., per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.08-$1.10 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$26.00-28.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$2.40-2.85
60-65%	2.85-2.90

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron: Swedish, c.l.f., Camden, N.J., c.l. lin bags	8.50
Domestic: F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, $6.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb. drum frght. allowed Carlots	36.00
Ton lots	38.00
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	41.75-65.25†
Bronze, 5000-lb lots	67.50-71.75†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	62.75-65.25†
Phosphor-Copper, 5000-lb lots	68.75
Silicon	67.50
Solder	7.00*
Stainless Steel, 302	99.60
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00‡

Tungsten	Dollars
Melting grade, 99%	
60 to 200 mesh: 1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Camden, N. J., ovens	26.50
Detroit, ovens	27.50
Pontiac, deld.	29.15
Saginaw, deld.	30.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island (Pittsburgh), Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Chicago, deld.	29.82
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.80	$6.80	$6.80	$7.20
Bar Size Angles	6.75	6.75	6.75	7.15
Structural Angles	7.05	7.05	7.05	7.45
I-Beams	7.45	7.45	7.45	7.85
Plates	8.50	8.50	8.50	8.90
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	6.80	6.80	6.80	7.20
Hot-Rolled Bands	7.10*	7.10*	7.10*	7.50*
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	7.50	7.50	7.50	7.90

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00
Birmingham area	36.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.	

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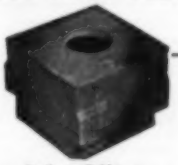

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CHICAGO 4 HOUSTON 2 LOS ANGELES

Scrap . . .

Scrap Prices, Page 204

Pittsburgh—One of the few large mills still operating in this district bought a "normal-size" amount of scrap last week. The purchase included No. 1 heavy melting at a price equivalent to $44 a ton, Pittsburgh, No. 2 heavy melting at $38 and No. 2 bundles at $35. The No. 1 price was $1 lower than the previous quotation in this area. Brokers are attempting to buy at currently low prices.

Cleveland—In the absence of mill buying because of the strike, steel scrap prices are unchanged. Prices are nominal with No. 1 steel $42-$43 in Cleveland and $44-$45 in the valley. Strikebound mills are laying down scrap in dealers' yards. Most of this tonnage is industrial material purchased prior to the strike.

The market tone is surprisingly strong. Vacation suspensions at manufacturing plants have cut scrap generation the past couple weeks. This, along with the rising belief among scrap men that the strike will be ended by Aug. 1, serves to infuse a high degree of strength into the market.

Youngstown—The scrap market is hard hit by the steel strike which has idled virtually all principal consumers in this area. The mills generally began embargoing scrap shipments days before the shutdown. However, Copperweld Steel Co., Warren, O., operating under an extension of its labor agreement, bought some No. 1 scrap at $49 for its electric furnaces.

Boston—Steel scrap buying and shipments are confined to exports and to two small domestic mills that are not affected by the strike, though one is down for vacations. Broker prices being paid are $2 to $3 higher than the nominal quotations prevailing on shipments for eastern Pennsylvania within a limited freight zone.

Philadelphia—A strong undertone prevails in scrap, notwithstanding the steel strike and light orders from steel plants in operation. Collectors' material is coming out slowly and less industrial scrap is around.

Some brokers are paying as high as $48 for the prime grades against old orders. While some No. 2 heavy melting was sold as low as $36, delivered, early in the month, brokers are now paying as high as $38 and $39, and they are paying up to $37 for No. 2 bundles.

Machine shop turnings have advanced to $33-$34, delivered, and heavy turnings to $44 on new sales to consumers. Mixed borings and

(*Please turn to page 206*)

CASE HISTORIES *prove*—

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Acmeflex 15 M 50 is Mylar, strongest plastic known, (50 Mylar) combined with Polyethylene .0015.

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Maximum against water and organic vapors and sulphur-bearing gases.

Forms Available?
Sleeves; flat sheets to 40" wide in rolls on 3" cores; folded sheet sealed on one edge.

Formability?
Into containers of practically any style, size, shape.

Ease of Packaging?
Can be cut, wares enclosed, and heat sealed on any standard, high speed, automatic equipment.

Color?
In stock: Pink, White, Clear. Or any color desired on volume orders.

Strength?
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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 10	$45.50
July 3	45.85
June Avg.	46.04
July 1955	39.67
July 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*$43.00-44.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft lengths	50.00-51.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	50.00-51.00
Electric furnace bundles	50.00-51.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	44.00-45.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	32.00-33.00
No. 1 machinery cast	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt	51.50-52.50
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	61.00-62.00
Railroad specialties	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	360.00-375.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	44.00-45.00
Cut structural plates 2 ft and under	51.00-52.00
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	42.00-43.00

Cast Iron Grades

No. 1 cupola	52.00-53.00
Charging box cast	38.00-39.00
Heavy breakable cast	42.00-43.00
Stove plate	49.00-50.00
Unstripped motor blocks	27.00-28.00
Brake shoes	37.00-38.00
Clean auto cast	50.00-51.00
Burnt cast	37.00-38.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
R.R. malleable	54.00-55.00
Rails, 2 ft and under	62.50-63.50
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	57.00-58.00
Cast steel	51.00-52.00
Railroad specialties	51.00-52.00
Uncut tires	52.00-53.00
Angles, splice bars	57.00-58.00
Rails, rerolling	61.00-62.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	100.00-110.00
430 turnings	59.00-60.00

YOUNGSTOWN

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	44.00-45.00
Machine shop turnings	26.00-27.00
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Low phos.	45.00-46.00
Electric furnace bundles	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt	51.00-52.00

CHICAGO

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*44.00-45.00*
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	33.00-34.00
No. 1 busheling	44.00-45.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	52.00-53.00
Punchings & plate scrap	53.00-54.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1. R.R. heavy melt	49.00-50.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Angles, splice bars	62.00-63.00
Rails, rerolling	*67.00-68.00*

Stainless Steel Scrap

18-8 bundles & solids	380.00-395.00
18-8 turnings	270.00-280.00
430 bundles & solids	105.00-110.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*41.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	*42.00*
No. 2 bundles	*29.00*
No. 1 busheling	*40.00*
Machine shop turnings	23.00
Mixed borings, turnings	23.00
Short shovel turnings	27.00
Punchings & plate scrap	*59.00*

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	38.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	25.00
Clean auto cast	51.00
Malleable	51.00

BIRMINGHAM

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Cast iron borings	20.00-21.00
Short shovel turnings	27.00-28.00
Machine shop turnings	25.00-26.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.50-49.50
Stove plate	47.00-48.00
Bar crops and plate	51.00-52.00
Structural & plate, 2 ft	49.00-50.00
Unstripped motor blocks	37.50-38.50
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18-in. and under	59.00-60.00
Rails, rerolling	64.00-65.00
Rails, random lengths	54.00-55.00
Angles, splice bars	54.00-55.00

PHILADELPHIA

No. 1 heavy melting	46.00-48.00
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	46.00-48.00
No. 2 bundles	37.00
No. 1 busheling	46.00-48.00
Electric furnace bundles	50.00
Mixed borings, turnings	34.00
Machine shop turnings	*33.00-34.00*
Short shovel turnings	36.00-37.00
Heavy turnings	*44.00*
Structurals & plates	51.00-53.00
Couplers, springs, wheels	68.00
Rail crops, 2 ft & under	64.00

Cast Iron Grades

No. 1 cupola	48.00
Malleable	67.00
Heavy breakable cast	52.00
Drop broken machinery	54.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	41.00-42.00
No. 2 bundles	*31.00-32.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	26.00-27.00
Short shovel turnings	*27.00-28.00*
Low phos. (structural & plate)	44.00-45.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	32.00-34.00
Heavy breakable	44.00-45.00

Stainless Steel

18-8 sheets, clips, solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-36.50
No. 2 heavy melting	26.00-26.50
No. 1 bundles	36.00-36.50
No. 2 bundles	25.00-25.50
No. 1 busheling	36.00-36.50
Machine shop turnings	20.00-20.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	42.00-42.50
Mixed cupola cast	37.50-38.00
No. 1 machinery cast	43.50-44.00

BUFFALO

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Mixed borings, turings	27.00-28.00
Machine shop turnings	25.00-26.00
Short shovel turnings	28.00-29.00
Cast iron borings	27.00-28.00
Low phos.	50.00-51.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	54.00-55.00
Rails,3 ft and under	59.00-60.00
Railroad specialties	50.00-51.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	*25.50-26.50*
Mixed borings, turnings	*28.50-29.50*
Short shovel turnings	*30.50-31.50*
Cast iron borings	*28.50-29.50*
Low phos., 18 in.	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	43.50-44.00
Heavy breakable cast	43.00-44.00
Craging box cast	43.00-44.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 18 in. and under	65.00-66.00
Rails, random lengths	56.00-59.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	36.00
No. 2 bundles	30.00
No. 1 busheling	36.00
Machine shop turnings	†
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	30.00
Heavy breakable cast	30.00
Unstripped motor blocks	30.00
Brake shoes	42.00
Clean auto cast	45.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*48.50*
Rails, 18 in. and under	62.00
Rails, random lengths	*55.00*
Rails, rerolling	*69.00*
Angles, splice bars	*55.00*

†Nominal

SEATTLE

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	39.00-40.00
No. 2 bundles	30.00-31.00
No. 3 bundles	20.00
Machine shop turnings	23.00-25.00
Mixed borings, turnings	23.00-25.00
Electric furnace No. 1	52.00-54.00

Cast Iron Grades

No. 1 cupola	42.00-45.00
Heavy breakable cast	36.00-38.00
No. 1 wheels	37.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	30.50-31.00
Brake shoes	38.00

Railroad Scrap

Rails, random lengths	43.00-44.00

LOS ANGELES

No. 1 heavy melting	41.00
No. 2 heavy melting	37.00
No. 1 bundles	40.00
No. 2 bundles	30.00
Machine shop turnings	21.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00

SAN FRANCISCO

No. 1 heavy melting	43.00
No. 2 heavy melting	40.00
No. 1 bundles	42.00
No. 2 bundles	35.00
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Heavy turnings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	42.00
Stove plate	39.00
Heavy breakable cast	39.00
Unstripped motor blocks	38.00
Brake shoes	35.00
Clean auto cast	48.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

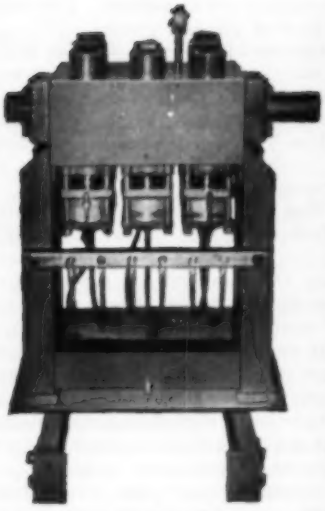
HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	*40.00*
No. 2 bundles	35.50
Mixed steel scrap	37.00
Busheling, new factory: Prepared	41.00
Unprepared	37.00
Short steel turnings	*20.00*

Cast Iron Grades†

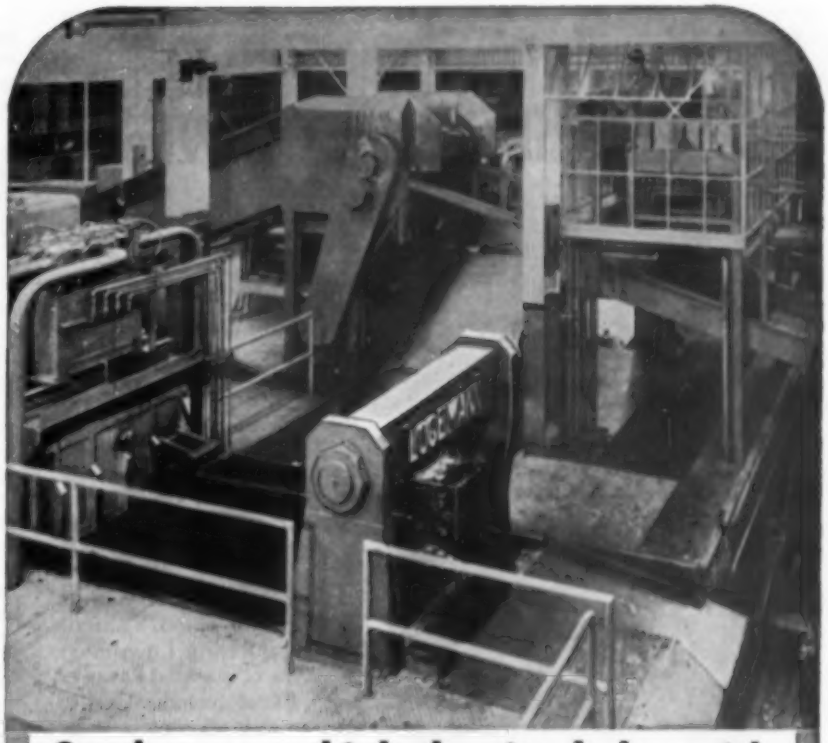
No. 1 machinery cast	50.00

†F.o.b., shipping point.



LOGEMANN HYDRAULIC OPERATING VALVE

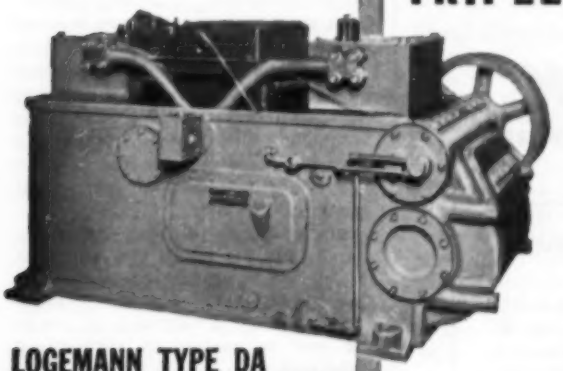
This compact valve was designed to control the movements of the hydraulic rams in large scrap presses but can be modified to suit similar operations on other hydraulic equipment. Interested parties will please outline the nature of the service, operating sequence, gallonage and pressure requirements.



Get low cost, high density bales with LOGEMANN SELF-CONTAINED TRIPLE-COMPRESSION PRESSES

The illustration shows one of two large scrap-press units in a modern automotive plant. Over a period of many years, such units have baled sheet scrap skeletons and trim from metal operations in large industrial plants throughout the country, forming the scrap into high-density bales for re-melting in steel mills. Low baling costs are the result of correct design for heavy duty service, minimum maintenance and operating interruptions, as well as simplicity, accessibility and safety features.

Pioneers in the metal baling field, LOGEMANN engineers embodied in the design those features that have proven dependable over an extended period of years. Some installations in service over 35 years are still operating economically.



LOGEMANN TYPE DA DOUBLE PRESSURE PUMPS

These compact and efficient opposed-cylinder reciprocating-plunger pumps for low and high pressure service lend themselves to a wide range of double pressure applications. They are close-coupled, reliable, and capable of delivering high gallonage, at low and high pressures, at low power costs.

Tell Us the nature of your scrap!

LOGEMANN press sizes are not confined to the large models. Producers of sheet scrap—steel, copper, brass, or aluminum—are invited to submit their scrap baling problems regardless of tonnage. Please state the character of the metal, minimum tonnage to be handled in a given period of hours, range of gauges and, where possible, indicate maximum and minimum lengths and widths of pieces. Experienced sales engineers are available for discussion of your conditions and requirements.

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Allison Cut-Off Wheels

Wide variety of shapes and materials cut with abrasive wheels

• Speed and quality of cut make abrasive cutting ideal for a wide range of operations. For example: one inch diameter cold rolled steel can be cut with a wheel cost of under ½ cent per cut and in 3 seconds.

ALLISON Cut-Off Wheels can provide smooth, high-quality cutting for almost any type of material however hard. These include steels of practically all analyses including corrosion-resisting types, brass, bronze, Monel Metal and other non-ferrous: aluminum alloy, magnesium and many others.

Whatever the problem there is an Allison Wheel to meet it . . .

Profitable abrasive cutting means using the right abrasive wheel . . . and the proper abrasive cut-off machine . . . for the specific job. If the required result is a smooth, fine finish, without hardening or metallurgical changes, a WET cut is called for. Rubber bonded ALLISON Wheels give long wheel life and high quality cuts for such an operation. If the cut is a big one (over 2" solid) an OSCILLATING Cut-Off machine . . . with the proper ALLISON Wheel . . . will do the job fast and economically. Where quality requirements are less exacting, dry cutting with ALLISON resinoid bonded wheels is often the best method.

Allison
ABRASIVE CUTTING WHEELS

Consult a specialist for best results

• ALLISON specializes in the manufacture of abrasive cut-off wheels. Be sure that you are getting the most from your cutting methods. Abrasive wheel cutting is faster than sawing—in some cases it is 10 to 20 times as fast. The savings in cost can be tremendous. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

ACCO

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ALLISON DIVISION
AMERICAN CHAIN & CABLE

2548 Island Brook Avenue, Bridgeport 8, Conn.

(*Concluded from page 203*)

turnings, electric furnace bundles, structurals and plate, and railroad specialties are unchanged. The same is true of the cast grades.

Buffalo—Practically no steel scrap is moving to consumers here. Prices are nominal. Dealers have effected sharp reductions in their buying prices. They say the market will drop noticeably should the steel strike be prolonged.

New York—Scrap brokers have advanced buying prices to $31-$32 on No. 2 bundles, $23-$24 on machine shop turnings and $27-$28 on short shoveling turnings. Scrap, they say, is coming out slowly. Further, they add, yardmen anticipate higher prices once the steel strike is settled. Some scrap is being stored outside the properties of strikebound steel plants, but not in sufficient volume to forestall an advance later, it is said.

Chicago—Except for two struck mills which are buying limited tonnages of industrial scrap and railroad grades, storing them off their premises, the scrap market here shows little life. Mills not affected by the strike are buying sparingly, but in connection with this, two price increases are noted—$38 has been paid for No. 2 heavy melting and $68 for rerolling rails, each up $1.

St. Louis—Scrap prices are holding on a fairly even keel. There is no evidence of distress selling or new demand pressures. The only fluctuations in the market are on railroad scrap, and these are minor in nature.

Birmingham—There is no activity in steel scrap due to the strike, but electric furnace and cast iron grades are moving freely. Some open-hearth material is moving north to mills still operating, but the amount is small.

San Francisco—Strong export demand, plus buying by one mill that is still operating here are sustaining the scrap market. Deliveries are slowing down due to diversion of trucking and manpower to agricultural endeavors.

Seattle—Scrap prices are nominal. Receipts continue large but are expected to taper off if the steel strike continues. Dealers are not inclined to increase their inventories in present circumstances. Foreign buyers are awaiting developments before placing new orders.

Los Angeles—The scrap market here is at a virtual standstill, with collections halted and mill shipments stopped except for deliveries to the Kaiser Steel plant at Fontana, Calif.

Cincinnati—The market here has moved upward following a two-week pause. No. 1 grades were marked up $1 per ton last week. Buying by one mill tended to give the market a

stronger tone. Noteworthy is the fact that only one steel producer in this district is strikebound.

Pig Iron . . . .

Pig Iron Prices, Page 191

Woodward Iron Co., Woodward, Ala., advanced pig iron prices $4 a ton to the basis of $58.50 on basic, $59 on No. 2 foundry and $63 on malleable. A like advance had been posted earlier by U. S. Pipe & Foundry Co., Birmingham.

The principal supplier of merchant iron to the Pittsburgh district is continuing to operate under a labor contract expiring Aug. 31.

Foundries are not suffering from a shortage of pig iron, but they will be affected should the strike last more than one month.

In the Buffalo district, Tonawanda Iron Division, American Radiator & Standard Sanitary Corp., continues to operate its single blast furnace. There are 15 idle blast furnaces in the district.

Iron Ore . . .

Iron Ore Prices, Page 201

Consumption of iron ore in the U. S. and Canada totaled 11,346,506 gross tons in May, reports the Lake Superior Iron Ore Association. This compares with 11,019,922 tons in the preceding month.

Of total consumption in the month, 7,641,430 tons were U. S. Lake Superior ore; 1,540,430 tons, other U. S. ores; 274,627 tons, Canadian Lake Superior ore; 600,703, other Canadian ore; 1,289,316 tons, foreign ores (except Canadian).

Cumulative consumption this year through May was 56,838,838 gross tons, of which 37,236,193 tons were U. S. Lake Superior ore; 8,573,892 tons, other U. S. ores; 1,506,804 tons, Canadian Lake Superior ore; 2,580,193 tons, other Canadian ore; 6,941,756, imported ore, except that from Canada.

Stocks of ore at U. S. docks and furnaces at the end of May amounted to 31,621,394 gross tons. This compares with 26,088,527 tons at the end of April. Of the total stocks held, 23,422,444 tons were Lake Superior ore; 2,556,489 tons, other U. S. ores; 587,802 tons, Canadian Lake Superior ore; 1,790,158 tons, other Canadian ore; 3,264,501 tons, foreign ores (other than Canada).

At the end of May there were 235 blast furnaces operating in the U. S. out of a total of 257. Twelve of 16 Canadian stacks were in blast.

Iron ore shipments down the Great Lakes route were cut almost in half in the week ended July 9, reflecting the idling of scores of lake carriers because of the steel strike. Shipments in the week totaled only 1,203,461 gross tons, reports the Lake Superior Iron Ore Association. This compares with about 3 million tons in each of the two preceding weeks.

Cumulative shipments in the 1956 season to July 9 were 32,849,008 gross tons. This was up 1,361,705 tons from the movement of 31,487,303 tons in the corresponding period of the 1955 season.

With most blast furnaces inactive because of the steel strike, stocks of imported iron ore are accumulating at some eastern ports.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 201

Now that foundry coke no longer is produced in the Chicago area, Peoples Gas Light & Coke Co. having shut down its coke ovens the last week in June, fuel is going to cost the foundries in the district about $1.12 a ton more.

Competition for foundry coke business at Chicago is developing from several directions, including ovens in Milwaukee, Indianapolis, Terre Haute, Ind., and St. Paul. The latter has a $26.50 oven price and a favorable freight rate of $3.32 to Chicago, to give a delivered price of $29.82.

Steel Shipments Set Record

A record 38,855,981 net tons of finished steel products were shipped in the first five months this year, reports the American Iron & Steel Institute. This topped the former record for the like period, set in 1955, by 4.6 million tons.

Shipments amounted to 7,764,776 tons in May against 7,784,000 in April, and 7,541,000 in May a year ago.

Six market classifications received larger tonnages in May than ever before in a month. All-time monthly records were set in the tonnages of reinforcing bars (230,250 net tons), standard pipe (316,028 tons), line pipe (367,109 tons), and in the total of pipe and tubing (1,054,763 tons) shipped in May.

During the month, warehouses—the largest market classification—took 1,623,853 net tons, or 21.8 per cent of total domestic shipments. Tonnage going to the construction industry (including maintenance) set a new monthly high at 981,871 tons.

Other records were set in shipments to contractors products (412,844 tons), electrical machinery and equipment (235,751 tons), mining, quarrying and lumbering (43,907 tons), and domestic and commercial equipment other than appliances, utensils and cutlery (229,674 tons).

The automotive industry received 1,160,000 tons in the month, 15.5 per cent of total domestic shipments. This compares with 1,153,000 tons (15.6 per cent) in April, and with 1,673,000 tons (23.1 per cent) in May, 1955.

Shipments of a number of finished steel products and to leading market classifications in May as compared with a year ago follow:

SHIPMENTS OF FINISHED STEEL
(Net Tons)

	May 1956	May 1955
Total shipments	7,765,300	7,541,000
Sheets, cold-rolled	1,268,000	1,279,000
Bars, hot-rolled	803,000	774,000
Sheets, hot-rolled	794,800	813,000
Plates	695,000	571,000
Structurals (heavy)	479,000	414,000

SHIPMENTS BY MARKET CLASSIFICATION
(Net Tons)

	May 1956	May 1955
Domestic shipments	7,454,000	7,232,000
Warehouses	1,624,000	1,405,000
Automotive	1,160,000	1,673,000
Construction	982,000	864,000
Containers	567,000	718,000
Machinery, etc.	480,000	495,000

Tin Plate . . .

Tin Plate Prices, Page 188

California's food packing industry hasn't been caught napping in the steel strike. Most packers anticipated the steel stoppage and stocked up heavily on cans.

"We don't think the strike will hurt us," one large area packer says.

CLASSIFIED

Accounts Wanted

MANUFACTURERS' AGENT — NEW YORK STATE. Currently covering O E M and metal fabricating accounts seeks new metals line. Well established with 8 years experience in copper, brass, aluminum and steel—all forms. Only mill line wanted. Reply Box 439, STEEL, Penton Bldg., Cleveland 13, Ohio.

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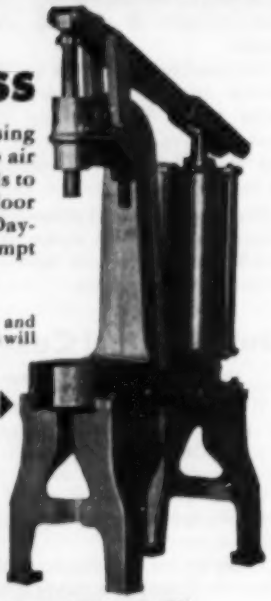

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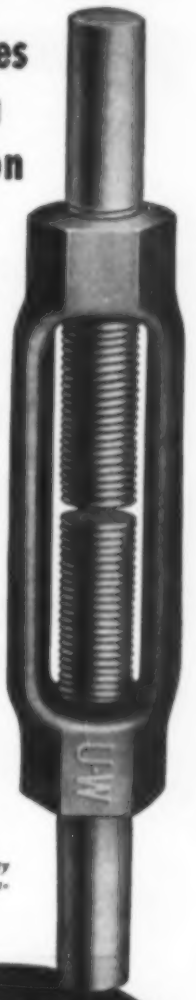
UPSON-WALTON

turnbuckles you can depend on

Weldless, hex-end bodies are drop forged from special bar quality forging steel.

Heads are drilled and tapped in perfect alignment, so that end fittings pull evenly.

Threading is American National Course series, class 2 fit, for easy assembly.



In the long run quality costs less. Specify Upson-Walton turnbuckles.

ENGINEERED FOR SAFETY

For prompt service call your U-W Distributor. Write for free catalog on wire rope fittings.

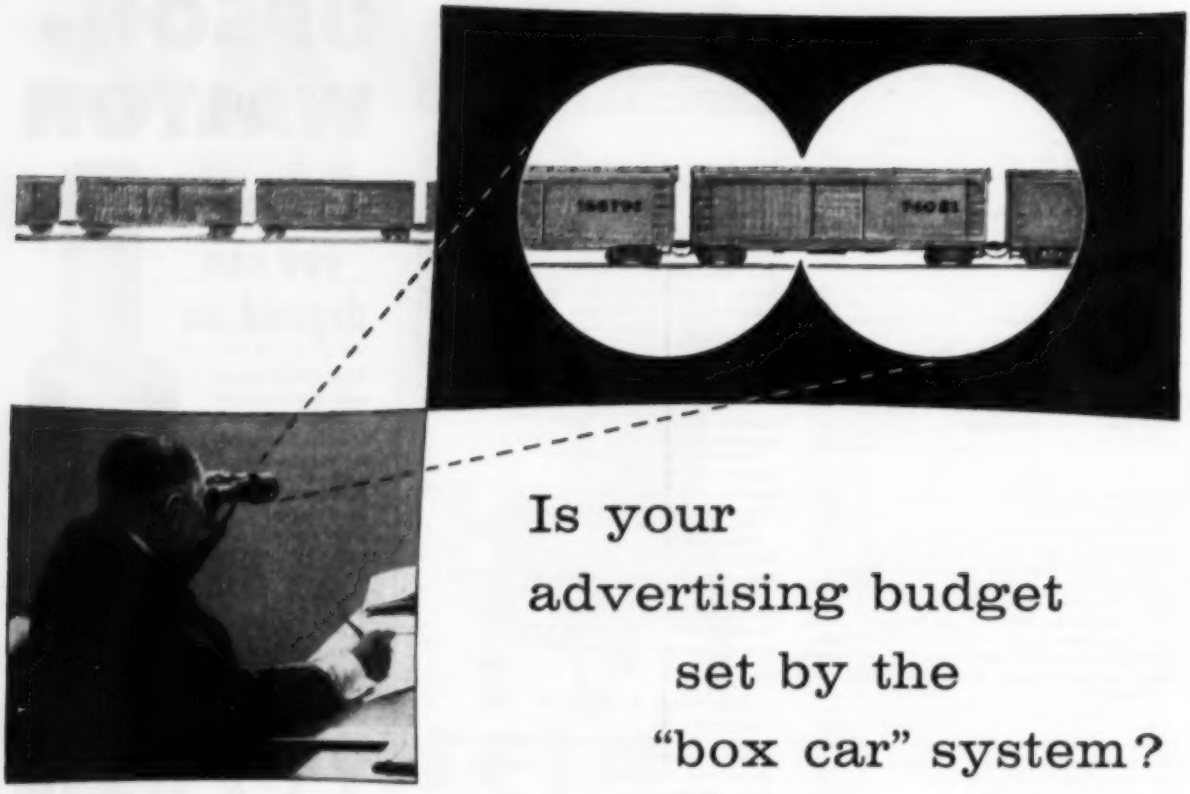
THE UPSON-WALTON COMPANY

12500 ELMWOOD AVENUE

CLEVELAND 11, OHIO

New York • Chicago • Pittsburgh

MANUFACTURERS OF TACKLE BLOCKS, WIRE ROPE, ROPE FITTINGS • ESTABLISHED 1871



Is your advertising budget set by the "box car" system?

Figures in an advertising budget may be impressively precise and detailed, but still be as unrealistic as if they were picked from passing box cars. Such a budget is good enough only if you haven't decided just what you want to accomplish in selling.

If, however, your company has a specific marketing plan, if you have set your sales objectives product by product and market by market, then you have the foundation for an advertising budget which represents *planned sales effort*, not merely anticipated expenditures.

When your advertising people know exactly what you plan to sell, where you plan to sell it, and how much you plan to sell, they can begin to fit advertising into the marketing program. They can select from the many forms of advertising those which are best fitted for specific tasks, determine how each one should be used and to what extent it should be used.

In short, they can give you an advertising budget which reflects *the sales job you want done.*

Industrial advertising is an integral part of the marketing process—and you are not getting full value for your advertising dollar unless your advertising men are kept fully informed on your marketing plans.

National Industrial Advertisers Association, Inc.

271 Madison Avenue, New York 16, New York

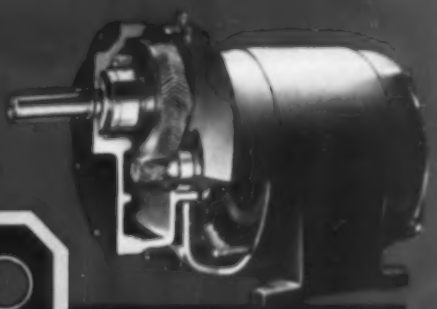
An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

Write your own ticket—

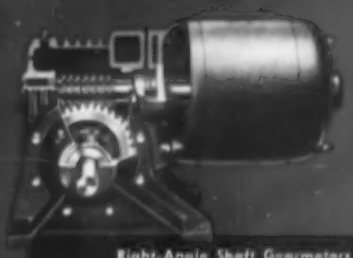
MASTER
ALTERNATING CURRENT MOTOR

SERIAL	✔		STYLE	✔	
TYPE	✔	FRAME ✔		H.P.	✔
VOLTS	✔		CYCLES	✔	
AMPS.	✔		PHASE	✔	
R.P.M.	✔		SERVICE FACTOR	✔	
CODE	✔	TEMP. RATING ✔			
SA	✔				

MANUFACTURED BY
THE MASTER ELECTRIC CO., DAYTON, O., U.S.A.
62916 PATENTS PENDING



Parallel Shaft Gearmotors



Right-Angle Shaft Gearmotors

Unibrake Motors

Speedrangers

Standard Motors—⅛ to 400 H.P.

What are your power drive requirements? Here at Master, with the widest selection in the nation to choose from, you're sure to fill your needs quickest and best.

Need something special in gear reduction—electric brakes—variable speed operation—fluid drive or special mounting? Or would some of our standard models (⅛ to 400 H.P.) fill the bill? You'll find the answer here! And remember, all Master components are engineered to form combinations of units in one streamlined, compact package of efficiency. Name your need and the name that fills it is Master—for greater salability of motor driven products; for increased productivity of plant equipment.

Motor Ratings ⅛ to 400 H.P. All phases, voltages and frequencies.

Motor Types Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

Construction Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

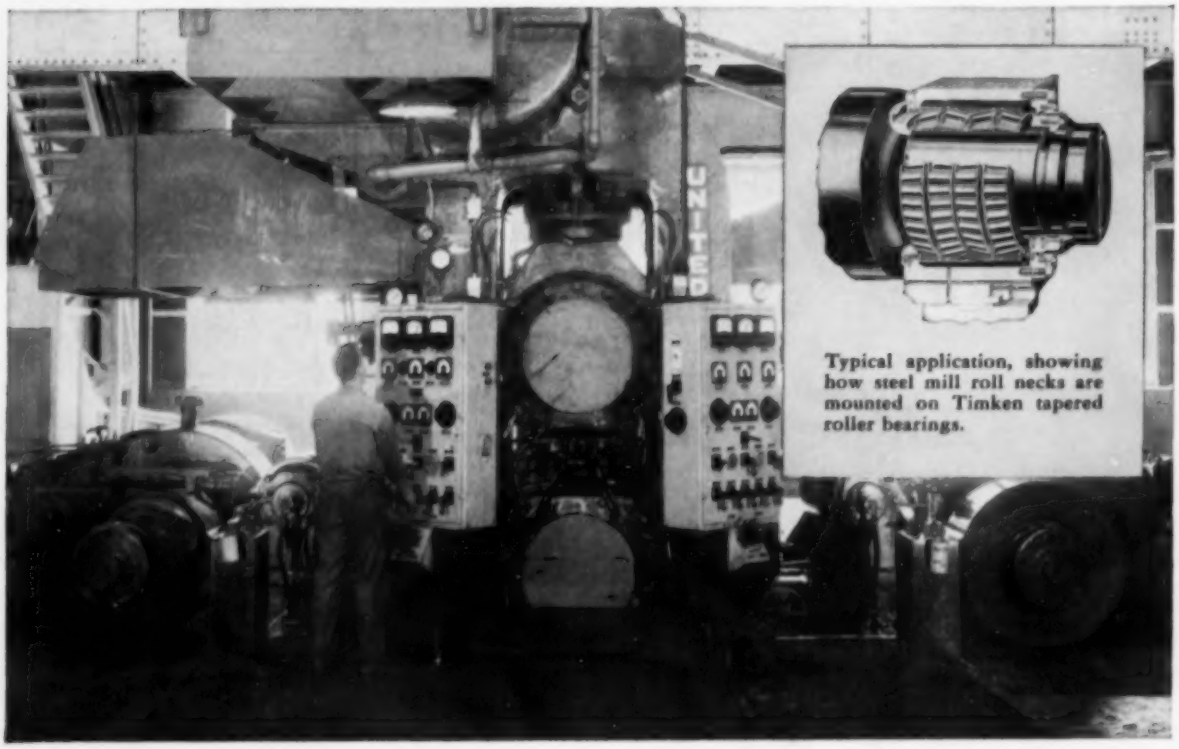
Speeds Single speed, multi-speed, and variable speed.

Installation Horizontal or vertical, with or without flanges and other features.

Power Drive Features Electric brakes (2 types)— 5 types of gear reduction up to 432 to 1 ratio. Mechanically and electronically-controlled variable speed units—fluid drives—every type of mounting.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

Scrap loss minimized with reversing cold mill back-up rolls on TIMKEN® bearings



Typical application, showing how steel mill roll necks are mounted on Timken tapered roller bearings.

THE back-up rolls on this United Engineering 6″ & 34″ x 30″ 4-high reversing cold mill at Allegheny Ludlum's Leechburg plant are mounted on Timken® tapered roller bearings. Timken bearings give low torsional resistance, regardless of operating speed or load. This eliminates the need for altering or relieving screw-down pressure — maintains gauge which minimizes scrap loss at each end of the coil. Less hydraulic accumulator pressure is needed with rolls driving easier on Timken bearings, which reduces bearing wear, cuts maintenance cost.

The balanced proportion design of Timken bearings provides maximum capacity in a given space. Timken tapered roller bearings give you greater mill rigidity, permit large diameter roll necks. They take both radial and thrust loads in any combination, require *no extra thrust devices*—which means more compact chuck mountings, simplified mill design. And by holding mill rolls rigid, Timken bearings help insure "on-gauge" operation, cutting scrap loss and reducing still further the cost per ton of steel rolled.

With Timken bearings, roll and chuck are held concentric, making closures more effective. There's less leakage of lubricant. And with economically grease-lubricated Timken bearings, lubrication requires no tubes, pipes or reservoirs. When you build or buy machinery, look for the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

TRADE-MARK REG. U. S. PAT. OFF.